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FINAL SITE INSPECTION REPORT SITES 4 AND 9 AREA OF CONCERN 3 (AOC3) NWS YORKTOWN CHEATHAM ANNEX WILLIAMSBURG VA

12/1/2011

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Final

Site Inspection Report
Site 4, Site 9, and Area of Concern 3

Naval Weapons Station Yorktown Cheatham Annex
Williamsburg, Virginia

Naval Facilities Engineering Command

Prepared for

Department of the Navy

Naval Facilities Engineering Command
Mid-Atlantic

Contract No.
N62470-08-D-1000
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December 2011

Prepared by

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Virginia Beach, Virginia

Executive Summary

This Site Inspection (SI) report summarizes the data and findings obtained from investigation activities conducted at Site 4, Site 9, and Area of Concern (AOC) 3, located at the Naval Weapons Station (WPNSTA) Yorktown Cheatham Annex (CAX) (**Figure ES-1**). The objectives of the SI are to determine whether a release of hazardous constituents has occurred from past Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related activities and, if so, determine whether a suspected release warrants further action.

SI activities were conducted in accordance with the *Site Inspection Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), Naval Weapons Station Yorktown Cheatham Annex, Sites 4, 9, and AOC 3* (CH2M HILL, 2009a).

In 1984, Sites 4 (approximately one acre) and 9 (approximately 7,000 square feet) were identified as potential sources of contamination in the *Initial Assessment Study of Naval Supply Center (Norfolk) Cheatham Annex and Yorktown Fuels Division* (NEESA, 1984). In 1998, AOC 3 (approximately one acre) was identified as a potential source of contamination during a site visit by the Navy, the United States Environmental Protection Agency (USEPA), and VDEQ (Navy, 2005).

A "CERCLA-related release" is a release of hazardous substances, pollutants, and contaminants eligible for CERCLA response as defined in CERCLA Sections 101(14) and 101(33). In other words, a "CERCLA-related release" is where past site-specific activities resulted in spilling, leaking, disposing, or similar discharging of hazardous substances, pollutants, or contaminants that are subject to CERCLA regulation into the environment.

To determine whether a CERCLA-related release occurred at each of the AOCs discussed above and/or whether any release warrants further action, samples of environmental media and related data were collected for evaluation. The environmental media data were evaluated via the three-step decision analysis process. The first evaluation of the data collected is the "release assessment" (i.e., Step 1). That is, where inorganic constituents above background or where any other constituents were detected, a potential release is suspected. It is important to note that identifying a "suspected release" does not necessarily mean a CERCLA-related release occurred. Nor does it mean that the potential release warrants further action. Additional evaluation (Steps 2 and 3), such as the consideration of historical site information and comparison of site-specific data to regulatory screening criteria, is then used to refine the understanding of the "suspected release." This additional evaluation is the subject of the remaining decision analysis steps. These remaining steps consider such information as CERCLA-eligibility of the constituents identified; presence of exposure pathways; and conservative and, where warranted, more realistic, risk-based and other screening values published by regulatory agencies. The additional evaluation also includes a holistic consideration of site-specific information (e.g., historical information, media data, etc.) to make a determination of whether the potential source area and the extent of contamination at each Site was sufficiently characterized, and whether the potential sources of contamination have been removed.

The outcome of the 3-step decision analysis process is a conclusion of whether a CERCLA-regulated release likely occurred and, if so, whether the suspected release warrants further action. If no CERCLA-regulated release is suspected, or if the data suggest a release does not warrant further action (e.g., after source area elimination has occurred), then preparation of a no action (NA) or no further action (NFA) decision document is recommended. If a CERCLA-regulated release is suspected that warrants further action, a recommendation for the further action is made.

For each Site or AOC investigated during this SI, the site history; data collection activities; results of the data evaluation, including the 3-step decision analysis; and conclusions and recommendations are summarized in **Table ES-1**. As shown in the table, the following next steps are recommended for each of the Sites:

Remedial Investigation

- Site 4
- AOC 3

Due to the close proximity of Site 4 and AOC 3 to each other and Upstream Pond, it is recommended that Site 4 and AOC 3 be combined into one Site, Site 4.

Expanded Site Inspection and Interim Removal Action

Site 9

TABLE ES-1
Summary of Conclusions and Recommendations
CAX Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

Site Name	Site Description	Site History	Potential Source(s)	Potential Release Mechanism(s)	Site Specific Data Collected	Results of 3-Step Decision Analysis	Conclusions	Recommendations
Site 4	Outdated Medical Supply Disposal Area	Unlined landfill where out-of-date medical supplies, including intravenous injection sets with syringes wrapped in aluminum foil or plastic, empty intravenous (IV) bottles, numerous sharps both metal and plastic, and one-inch metal banding were disposed. In addition, railroad ties, metal, various trash and construction materials are scattered across the site.	Buried Debris	Leaching of constituents from buried debris into soil, groundwater, and/or drainage ditches	16 test Pits and 6 test holes were installed to determine the vertical and horizontal extent of buried debris; 10 surface soil samples, 9 subsurface soil samples, and 4 groundwater samples were collected from throughout the site; and 5 surface water samples, 5 surface sediment, and 5 subsurface sediment samples were collected from the site drainage ditches	The data suggest the vertical and horizontal extent of debris have been characterized. In addition, the data suggest exposure to soil, groundwater, surface water and sediment may result in unacceptable risks to human health and the environment.	The data suggest that additional soil, groundwater, surface water, and sediment will need to be collected to characterize the nature and extent of constituents within these media.	Conduct an RI to characterize the nature and extent of contamination within soil, groundwater, surface water and sediment and to quantify the risk associated with all media. Conduct a FS to mitigate potential risks to human health in direct contact with debris and from potential contamination.
Site 9	Former Transformer Storage Area	Between 1973 and 1980, electrical transformers, some of which contained PCBs, were stored prior to transfer or disposal.	Releases from transformers stored onsite	Leaching of constituents from surface soil into subsurface soil and groundwater; surface runoff into the drainage ditches	18 surface soil samples, 5 subsurface soil samples, and 4 groundwater samples were collected throughout the site; and 3 surface sediment and subsurface sediment samples were collected from the downgradient drainage ditch (across B Street).	The data suggest exposure to surface soil and sediment may result in unacceptable risk to human health and the environment. In addition, the subsurface soil and groundwater have been sufficiently characterized.	The data suggest that additional surface soil and sediment samples will need to be collected to further characterize the extent of consituents within these media.	Conduct an expanded SI and interim removal action to further characterize and mitigate copper in surface soil, and PAHs, Aroclor-1260, and arsenic, chromium, mercury, and selenium in sediment.
AOC 3	CAD 11/12 Pond Bank	The history of this site is unknown. A 1955 aerial photograph shows ground scarring and indicates that this area was disturbed in the past and presents the potential of buried debris.	Buried Debris	Leaching of constituents from buried debris into soil, groundwater, and/or Upstream Pond; surface runoff into Upstream Pond	24 test pits were installed to determine the vertical and horizontal extent of debris; 11 surface and shallow subsurface soil samples and 5 groundwater samples were collected throughout the site; 4 deep subsurface soil samples were collected from beneath the buried waste; 8 surface water and 12 surface and subsurface sediment samples were collected from Upstream Pond.	The data suggest the vertical and horizontal extent of debris have not been characterized. In addition, the data suggest exposure to soil, groundwater, surface water and sediment may result in unacceptable risks to human health and the environment.	The data suggest that additional test pitting will need to be conducted to determine the vertical and horizontal extent of buried debris near Upstream Pond. Additional soil, groundwater, surface water, and sediment will also need to be collected to characterize the nature and extent of constituents within these media.	Conduct an RI to characterize the nature and extent of contamination within soil, groundwater, surface water and sediment and to quantify the risk associated with all media. Conduct a FS to evaluate remedial alternatives to mitigate potential risks to human health in direct contact with debris and from potential contamination. Due to the close proximity of Site 4 and AOC 3 to each other and Upstream Pond, combine this site (AOC 3) with Site 4.

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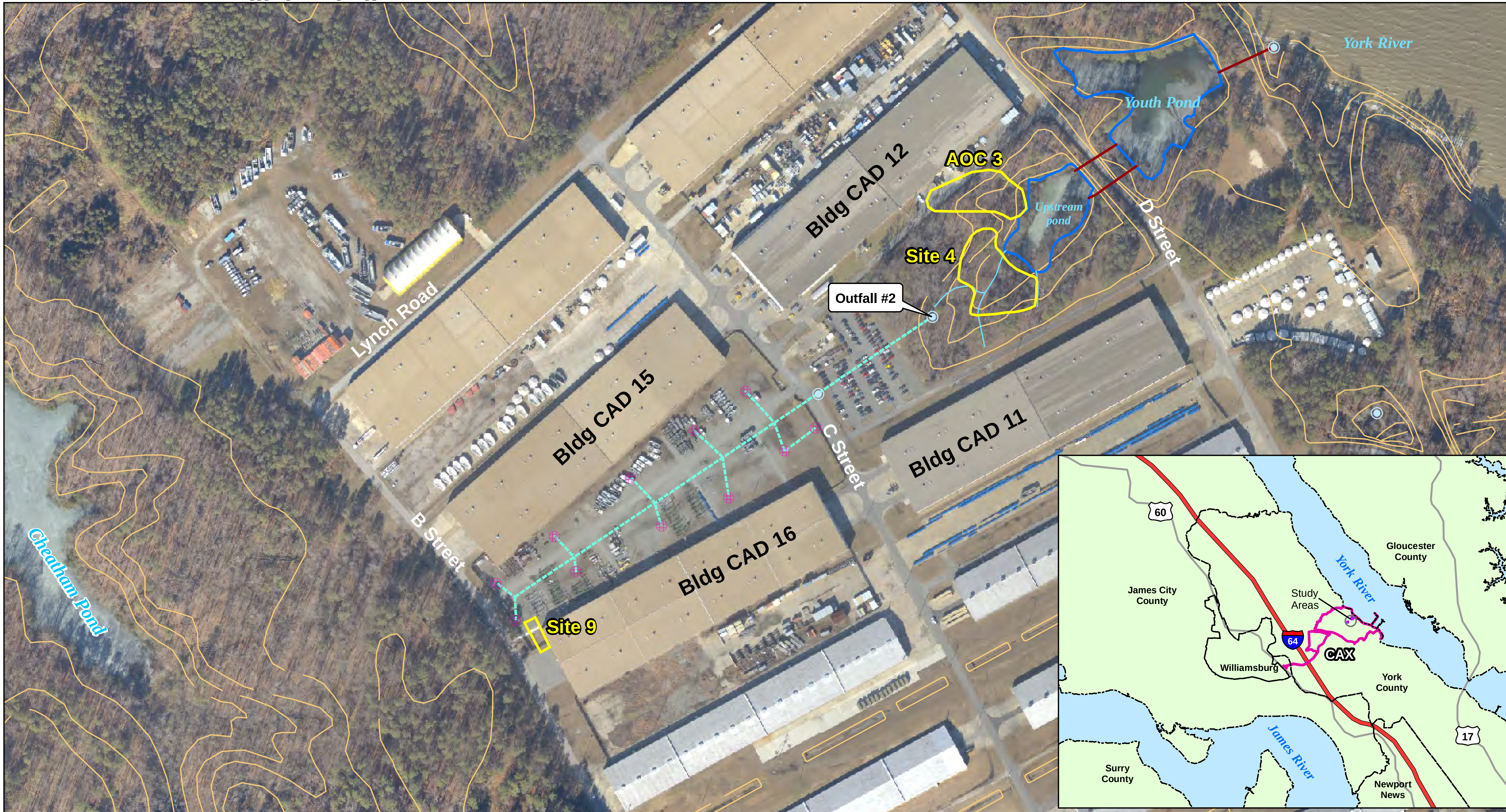

Legend

Outfall	Culvert
Drop-In Boxes	Elevation Contours
Drainage Channels	Study Area Boundary
Storm Water Line	Water Body

N

0 250 500 Feet

Figure ES-1
Sites 4, 9, and AOC 3 Location
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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Acronyms and Abbreviations

AOC	area of concern
AVS/SEM	acid volatile sulfide/simultaneously extractable metals
$BaCO_3$	barium carbonate
$BaSO_4$	barium sulfate
bgs	below ground surface
BTAG	Biological Technical Assistance Group
CAD	Cheatham Annex Depot
CAX	Cheatham Annex
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action—Navy
COPC	constituents of potential concern
CSM	conceptual site model
CTO	Contract Task Order
cy	cubic yards
˚F	degrees Fahrenheit
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
DoD	Department of Defense
DPT	direct push technology
EC_{50}	Effect Concentration to 50 percent of the population
EFH	Essential Fish Habitat
EPC	exposure point concentrations
EPIC	Environmental Photographic Interpretation Center
EqP	Equilibrium partitioning
ER	Environmental Restoration
ERA	Ecological Risk Assessment
ESV	ecological screening value
ft/day	feet per day
GPS	global positioning system
HHRA	Human Health Risk Assessment
HI	hazard index
HMW	high molecular weight
HQ	hazard quotient

IDW	investigation-derived waste
IV	intravenous
LC_{50}	Lethal Concentration to 50 percent of the population
LCS	Laboratory Control Sample
LMW	low molecular weight
LOAEL	Lowest Observed Adverse Effect Level
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µm	micron
MATC	Maximum Acceptable Toxicant Concentration
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
NA	no action
NAVD	North American Vertical Datum
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NFA	no further action
NOAEL	No Observed Adverse Effect Levels
NPL	National Priorities List
ORP	oxidation-reduction potential
PAH	polycyclic aromatic hydrocarbon
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
ppb	parts per billion
PPE	personal protective equipment
ppt	parts per thousand
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
QL	quantitation limit
RPD	relative percent differences
RRF	relative response factor
RSL	Regional Screening Level
RTK	Real-Time Kinematic
SAP	Sampling Analysis Plan
SERA	Screening Ecological Risk Assessment

SI	Site Investigation
SIM	selective ion monitoring
SOP	standard operating procedure
SSA	Site Screening Area
SSL	Site Screening Level
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbon
TSCA	Toxic Substances Control Act
U.S.	United States
UCL	upper confidence limit
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VOC	volatile organic compound
WPNSTA	Naval Weapons Station

SECTION 1

Introduction

This Site Inspection (SI) report presents the data and findings obtained from field investigation activities conducted at Site 4, Site 9, and Area of Concern (AOC) 3, located at Naval Weapons Station (WPNSTA) Yorktown Cheatham Annex (CAX) in Williamsburg, Virginia (**Figures 1-1 and 1-2**). Site 4—Outdated Medical Supply Disposal Area consists of surface and buried debris; Site 9—Former Transformer Storage Area was used to store polychlorinated biphenyl (PCB)-containing electrical transformers; and AOC 3—Cheatham Annex Depot (CAD) 11/12 Pond Bank consists of a small disposal area of metal banding, a few empty drums, and charred wood.

This Report was prepared under the United States (U.S.) Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic Division, Comprehensive Long-term Environmental Action—Navy (CLEAN) N62470-02-D-3052, Contract Task Order (CTO) 190, for submittal to NAVFAC, United States Environmental Protection Agency (USEPA) Region 3, and the Virginia Department of Environmental Quality (VDEQ). The Navy, USEPA, and VDEQ work jointly as the CAX Tier I Partnering Team.

In 1984, Sites 4 and 9 were identified as potential sources of contamination in the *Initial Assessment Study of Naval Supply Center (Norfolk) Cheatham Annex and Yorktown Fuels Division* (NEESA, 1984). In 1998, AOC 3 was identified as a potential source of contamination during a site visit by the Navy, USEPA, and VDEQ (Navy, 2005).

SI field activities were conducted at Site 4, Site 9, and AOC 3, to determine whether a release of hazardous constituents has occurred from past Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related activities and, if so, determine whether a suspected release warrants further action. Investigation activities were conducted in accordance with the Sampling and Analysis Plan (SAP) (CH2M HILL, 2009a).

1.1 Objectives and Approach

The overall objectives of the SI are to determine whether a release of hazardous constituents to environmental media has occurred from past CERLCA-related activities, and determine the appropriate path forward for each Site/AOC. The specific objectives of and approach of the SI is as follows:

- Further characterize the environmental media at Site 4, Site 9, and AOC 3.
- To determine whether a suspected release warrants further action for those Sites where a release attributed to CERCLA-regulated activities is suspected (based on historical information, constituent-specific information, comparison of the detected concentrations to background levels and screening values, and, where warranted, evaluation of the screening value exceedances).

1.1.1 Decision Analysis

To achieve these objectives, a series of evaluations was conducted using the historical information and sample data for each Site. This evaluation process consisted of three steps as follows:

Step 1—Determination of Potential CERCLA Eligibility, and if CERCLA-eligible, has a CERCLA-regulated release occurred at the site?

To have a standard evaluation process for all CAX Sites and AOCs, the first phase of Step 1 in the decision analysis is to determine if a Site or AOC is potentially CERCLA-eligible by evaluating information included in historical records, aerial photographs, and site visit observations. If the Site is determined to be CERCLA-eligible—that is, if it is reasonable to assume CERCLA-regulated hazardous substances may have been released at the Site—site-specific analytical data are evaluated, if available.

Site 4, Site 9, and AOC 3 warranted sampling as part of an SI, and these Sites are considered potentially CERCLA-eligible. The second phase of Step 1 is to determine if there has been a potential CERCLA-regulated release at each Site or AOC. A "CERCLA-regulated release" is a release of hazardous substances, pollutants, and contaminants eligible for CERCLA response as defined in CERCLA Sections 101(14) and 101(33).

A potential release is suspected if any inorganic constituents inconsistent with background concentrations are detected or if any other constituents are detected. To help determine whether site-specific inorganic concentrations are inconsistent with background inorganic concentrations, at a minimum, discrete sample concentrations are compared to the basewide background concentrations for individual inorganics. If it is determined that a release has occurred, the process continues to Step 2.

Step 2—Does the CERCLA Release Pose Potential Unacceptable Risks to Human Health and the Environment?

Step 2a—Comparison to Conservative Screening Values

If a CERCLA-regulated release is suspected, site-specific data (that exceed background concentrations, if available) are compared in Step 2a to the most conservative screening values, which comprise (as applicable) the following:

- USEPA Regional Soil Screening Levels (SSLs) for protection of groundwater (soil), (May 2010)
- USEPA Regional Screening Levels (RSLs) for Residential Soil Adjusted (soil), Residential Soil × 10 Adjusted (sediment), Tapwater Adjusted (groundwater), and Tapwater × 10 Adjusted (surface water) (May 2010)
- Federal Safe Drinking Water Act (Title 40 of the Code of Federal Regulations [CFR], Part 141) Maximum Contaminant Levels (MCLs) and Secondary MCLs (groundwater).
- Site-specific ecological screening values (ESVs) (soil, groundwater, surface water, sediment), (sources included in the ecological risk screening appendix).

In addition, on a site-specific basis, other screening criteria are used for data comparison. Toxicity Characteristic Leaching Procedure (TCLP) sample screening criteria used during the SI for evaluation of investigation-derived waste (IDW) disposal options are provided in USEPA SW-846, *Test Methods for Evaluating Solid Waste, physical/Chemical Methods.*

For the SI, it is appropriate to compare only those site-specific concentrations above background concentrations to risk-based screening criteria because the objectives of the SI are to not only determine whether a CERCLA-related release has occurred, but also to assess if the release warrants further investigation or action. Background concentrations, therefore, must be considered as part of this process. For the purposes of this SI Report, the background upper tolerance limits (UTLs) used for comparison are different from the background upper confidence limits (UCLs) initially proposed in the SAP (CH2M HILL, 2009a). The rationale for comparing the SI analytical data to background UTLs instead of background UCLs is documented below.

Progression and Justification for Using Background UTLs Instead of Background UCLs for Analytical Data Comparison

Approved soil and groundwater background data for WPNSTA Yorktown were documented in the *Summary of Background Constituent Concentrations and Characterization of Biotic Community from the York River Drainage Basin, Naval Weapons Station Yorktown, Yorktown Virginia* (Baker, 1995) and for CAX in the *Background Investigation, Naval Weapons Station Yorktown, Yorktown, Virginia, Cheatham Annex Site, Williamsburg, Virginia* (Baker, 2003). These reports document calculation of a 95 percent UCL of the mean using the individual WPNSTA and CAX data sets, and these data have been conservatively used for previous CERCLA release/risk management assessments and remedial actions.

In July 2009, the USEPA and VDEQ approved the *Background Study Work Plan Naval Weapons Station Yorktown, Yorktown, Virginia and Cheatham Annex, Williamsburg, Virginia*. (CH2M HILL, 2009b) to revise the representative background concentrations in soil and groundwater. The objective of the background study was not to re-evaluate or revisit past use of background data, but rather to supplement existing data and establish a more robust and representative background data set for future application to CERCLA investigations/ actions based on the following:

- The 95 percent UCL of the mean provides a conservative estimate of the mean and is used in determining whether the mean of a population exceeds a constant threshold. As such, it provides a statistic about the center tendency of a given population and does not address individual concentrations or provide an estimate of the upper tail of the distribution.
- A UTL is a more appropriate background threshold value because it represents a UCL of an upper percentile, specifically for this evaluation, the 95 percent UCL of the 95th percentile. Individual values consistent with the Site population will only rarely exceed the UTL.
- The greatest possible sample size, and therefore a more comprehensive background data set, can be realized by combining existing background data from WPNSTA Yorktown and CAX, facilities that share a common geographic boundary and the same physiographic, hydrogeologic, and soil association characteristics, which is further

demonstrated by the fact that much of the background data collected as part of the CAX study are from samples collected on WPNSTA Yorktown.

- Insufficient background groundwater data existed for the Yorktown-Eastover aquifer relevant to future CERCLA groundwater investigations. More current background data from existing and new wells for this transient medium were preferred.

- Existing background surface water and sediment data (Baker, 1995) were collected from Navy property in pristine environments of the York River watershed, and development over time of a more representative surface water and sediment reference data set through site-specific investigations is considered a more representative and cost-effective approach.

The CAX background UTLs are documented in the Final Background Report (CH2M HILL, 2011).

Step 2b—Conduct a Semi-Quantitative Risk Evaluation Using More Realistic Assumptions

For constituents that are found above the conservative screening values during Step 2a, an additional evaluation using more-realistic assumptions is conducted in Step 2b. This additional evaluation was conducted to help determine if further investigation or action would be warranted. For the purposes of this SI, the more realistic evaluation involved completing a semi-quantitative risk screening to determine if those constituents exceeding conservative screening values pose a potential risk to human health and the environment. This process allows a "look ahead" to see what the likely risk drivers (if any) will be at the site. If the recommended path forward for a Site or AOC is an Expanded SI or Remedial Investigation, the entire SI data set would be carried forward for further quantitative risk assessment. Human health and ecological risk screenings were conducted for Site 4, Site 9, and AOC 3. Details regarding the steps and processes used to conduct the human health and ecological risk screenings are provided in **Appendices A** and **B**, respectively.

Step 3—Is Further Investigation or Action Required?

For Step 3, the results of Step 2, the historical site information, spatial distribution of constituents, and constituent concentrations are evaluated to ensure that the potential source area and the extent of contamination for a CERCLA-regulated release have been sufficiently characterized. If the characterization is complete, recommendations for a path forward will be provided. If the recommended path forward is further investigation, the details regarding its implementation will be submitted under separate cover in a UFP-SAP.

1.2 Organization of the Site Investigation Report

The SI Report is organized as follows:

- **Section 1, Introduction,** provides the objectives and decision analysis process of the SI and describes the physical characteristics of CAX.

- **Section 2, Investigation Methodology,** summarizes the 2009 SI field investigation and data collection activities.

- **Sections 3 through 5** includes the history of investigations, conceptual site model (CSM), including site history, the site physical setting, distribution of contamination and human health and ecological risk evaluations, and the decision analysis for each Site or AOC. Each section also includes the conclusions and recommendations for the particular Site or AOC.

- **Section 6, References,** lists the documents used in preparation of this report.

Tables and figures are presented at the end of each section, as applicable.

1.3 Physical Characteristics of Cheatham Annex

This subsection summarizes the environmental setting of CAX, including a description, history, land use, climate, topography, surface water, hydrogeology, and ecological resources. Site-specific information pertinent to the release assessment is included in the site-specific sections.

1.3.1 Cheatham Annex Description and History

CAX consists of 2,300 acres of land on the York-James Peninsula, northwest of WPNSTA Yorktown (**Figure 1-1**). CAX had been the location of the former Penniman Shell Loading Plant, a large powder and shell loading facility operated by DuPont during World War I. The facility closed in 1918, and the property was used for farming or remained idle until CAX was commissioned in 1943 as a satellite unit of the Naval Supply Depot. From 1943 to the present, CAX has performed services in support of Naval ordnance missions that include packing and shipping materials, warehousing, inventory management, local delivery, fuel management and distribution, technical support, customer service, and care of sponsor-owned material. In 1987, CAX was designated the Hampton Roads Navy Recreational Complex. Today, the mission of CAX also includes recreational opportunities to military and civilian personnel, with outdoor recreational facilities including cabins, camp sites, an 18-hole golf course, swimming pool, ball fields, freshwater and saltwater fishing areas, boating, wildlife watching, and hunting.

CAX is bordered by Colonial National Historical Park on the northwest and east, Queens Lake subdivision to the west, and the city of Williamsburg to the south and southwest. The majority of CAX is undeveloped and heavily wooded. Surface water features at CAX consist of Cheatham Pond, Jones Mill Pond, Penniman Lake, and the York River. Potable water at CAX is provided by Newport News Waterworks (ASTDR, 2004).

In October 1998, control of CAX was transferred from Fleet and Industrial Supply Center to WPNSTA Yorktown. On November 30, 2000, CAX was included on the National Priorities List (NPL). The CAX FFA was signed in March 2005 and identified a total of 12 Sites and seven AOCs (Navy, 2005). Site 4, Site 9 and AOC 3 are depicted on **Figure 1-2**.

1.3.2 Current and Potential Future Land Use

Land use at CAX is categorized as Military Use. Land uses of surrounding areas include conservation/recreation, commercial, residential, industrial, public, and agricultural (Baker, 2003). The future land use at CAX is expected to remain unchanged.

1.3.3 Climate

The climate of the Virginia Peninsula is influenced by the moderating effects of the Atlantic Ocean. This results in mild winters and long, warm summers. High humidity frequently occurs along the coast and less frequently inland. Ground fog is frequent in the late summer, especially during the early morning hours. Freezing temperatures occur intermittently from October through March. Average monthly temperatures in the area range from approximately 38.8 degrees Fahrenheit (˚F) in January to 77.4˚F in July (Baker, 2003).

Because of its location near the coastline, York County is subject to easterly storms throughout late summer and early fall, causing high tides and flooding. Intense hurricanes occasionally sweep the coast. Winter is characterized by storms that move along the eastern seaboard. The storms from the north are associated with high winds and precipitation, occasionally in the form of snow, sleet, or rain; however, the snow is seldom prolonged or heavy. The average annual precipitation is 44 inches, with the summer months being the wettest and the winter months being the driest (Baker, 2003).

Spring is a period of contrasting weather, particularly during March. Spring and autumn are periods of frost. Summer is warm and humid with occasional showers and afternoon thunderstorms. Autumn is a season of comfortable temperatures (average temperature 60˚F to 81˚F) and generally pleasant weather (Baker, 2003).

Winds are highly variable in the area of CAX. Prevailing winds are usually from the south-southwest, but north-northeasterly winds are common in some months. Onshore winds predominate during the spring and summer (Baker, 2003).

1.3.4 Topography and Surface Water

The topography at CAX is characterized by gently rolling terrain dissected by ravines and stream valleys trending predominantly northeastward toward the York River. Ground elevations at CAX vary from sea level along the eastern boundary, which borders the York River, to a maximum elevation of approximately 50 feet above mean sea level (msl) on a few scattered hills in the western portion of the Annex. Valleys consisting of 40- to 60-foot ravines with steep slopes (slopes exceeding 1:1) occur along the major creeks draining CAX (Baker, 2003).

CAX is bordered on the west by Cheatham Pond, on the north by the mouth of Queen Creek, on the east by the York River, and on the south by King Creek. In 1943, dams were constructed to create the 108-acre Cheatham Pond from the Queen Creek, as well as the 43-acre Penniman Lake from King Creek; both creeks are tidal, however, Cheatham Pond and Penniman Lake are not. Damming a portion of the Cub Creek watershed formed Jones Pond, a 69-acre freshwater non-tidal pond enclosed by several wooded ravines and located in the northwestern section of CAX. Numerous small creeks flow through wooded ravines throughout CAX and drain into tidal creeks that join the York River. In most areas, forests extend to the marsh and lake margins. The tributaries of CAX all drain into the York River (Baker, 2003). The Walt Feurer Youth Pond (2 acres) and the Cat Fish Pond (1 acre) are shallow, warm water, man-made ponds (Navy, 1998).

1.3.5 Geology

CAX is located in the Atlantic Coastal Plain Physiographic Province which is underlain by multiple layers of unconsolidated sediments of Quaternary, Tertiary, and Cretaceous ages (**Figure 1-3**). The granite rock formations of the Appalachian Mountains to the west were eroded and sediment was transported from the mountains by rivers and streams to the coast, building up layers of sediment that fanned out onto the Atlantic continental shelf. Successive sea level rises deposited fluvial estuarine and marine sediment further, building the Coastal Plain. Widely fluctuating sea levels split the Coastal Plain into river terraces of different elevations bounded by scarp features that resulted from shoreline erosion. The Coastal Plain includes four terraces: Lackey Plain, Croaker Flat, Huntington Flat, and Grafton Plain (from highest to lowest); and three scarps: Kingsmill, Lee Hall, and Camp Peary. As shown on **Figure 1-4**, CAX is located within the Lackey Plain and Croaker Flat terraces separated by the Camp Peary scarp located along the York River (Brockman et al., 1997).

A total of 10 geologic formations have been identified (Brockman et al., 1997) beneath CAX. The uppermost geologic formations consists of alluvial, colluvial, and marsh deposits composed of silt, sand, and pebbles with some clay.

In terms of the uppermost soils, Site 4, Site 9, and AOC 3 are located within Soil Association Group 2, one of the four soil association groups identified at CAX during a 1985 soil survey report for CAX prepared by the Soil Conservation Service. Soils in Soil Association Group 2, the Dogue, Pamunkey, and Uchee Association (**Figure 1-5**), were formed on river terraces and are deep, moderately to well- and poorly-drained soils with clayey and loamy subsoils (Baker, 2003). A more detailed description of the soils within Soil Association Group 2 can be found in the CAX Background Investigation (Baker, 2003).

1.3.6 Hydrogeology

The 10 geologic units beneath CAX are grouped into hydrostratigraphic units based on hydraulic characteristics. The aquifers separated by confining or semi-confining units relevant to CERCLA investigations at CAX are, from youngest to oldest, the Columbia aquifer, the Cornwallis Cave aquifer, and the Yorktown-Eastover aquifer. Groundwater flow is locally controlled by topography with discharge to nearby surface water bodies and a primary flow and discharge direction toward the York River.

Where present, the Columbia aquifer ranges in thickness from 5 to 10 feet, with horizontal hydraulic conductivity between about 0.4 to 8 feet per day (ft/day) and vertical hydraulic conductivity between 1.7×10^{-4} to 1.7×10^{-1} ft/day (Brockman et al., 1997). The hydraulic properties of the Cornwallis Cave aquifer are highly variable due to depositional effects and physical and geochemical weathering. In general, horizontal hydraulic conductivity ranges from 0.3 to 9 ft/day and vertical conductivity ranges from 6.2×10^{-4} to 2.4×10^{-1} ft/day (Speiran and Hughes, 2001). Finally, the thickness of the Yorktown-Eastover aquifer across CAX ranges from 60 to 100 feet. Horizontal hydraulic conductivity ranges from 0.004 to 3 ft/day and vertical hydraulic conductivity ranges from 1.7×10^{-5} to 4.8×10^{-1} ft/day.

1.3.7 Ecological Resources

Terrestrial flora on CAX consists predominantly of woodland species (Baker, 2005a). The following three types of forest are present:

- Pine stands composed primarily of loblolly and Virginia pines
- Mixed pine and hardwood stands
- Hardwood stands

Elevated areas are the predominant locations of pine stands, while hardwood stands are found on slopes and ravines. Native tree species found at CAX include beech, black cherry, red maple, sweet gum, various pines, white ash, and white oak. The woodland's understory is composed of various seedling trees and vine species, such as Virginia creeper, briars, and honeysuckle. Ferns are found in many moist, shaded areas. Ornamental trees and shrubs have been planted in the improved areas and along major roadways. None of the plant species that occur on CAX are listed on the federal or Commonwealth endangered lists (Baker, 2005a).

Small, undeveloped tracts of land at CAX support a variety of indigenous wildlife species. Whitetail deer, beaver, skunk, bobcat, red and gray fox, squirrel, raccoon, opossum, and rabbit are present. Game birds, such as wild turkey, quail, duck, and pheasant, are also resident. Songbirds common to the eastern Virginia area are in abundance at CAX, along with a raptor population consisting of small hawks, owls, and osprey. Carrion-feeding birds such as crows and turkey vultures are also common. The southern bald eagle (federally and state protected) is known to nest nearby at WPNSTA Yorktown. Suitable habitat exists for roosting and perching in the area, but only occasional sightings of eagles have been made (Baker, 2005a).

Wetlands are mainly found along principal tributaries to the York River and along the York River shoreline at CAX. The following four major marsh types exist along these margins:

- Saltmarsh cordgrass communities
- Big cordgrass communities
- Cattail communities
- Brackish water mixed communities

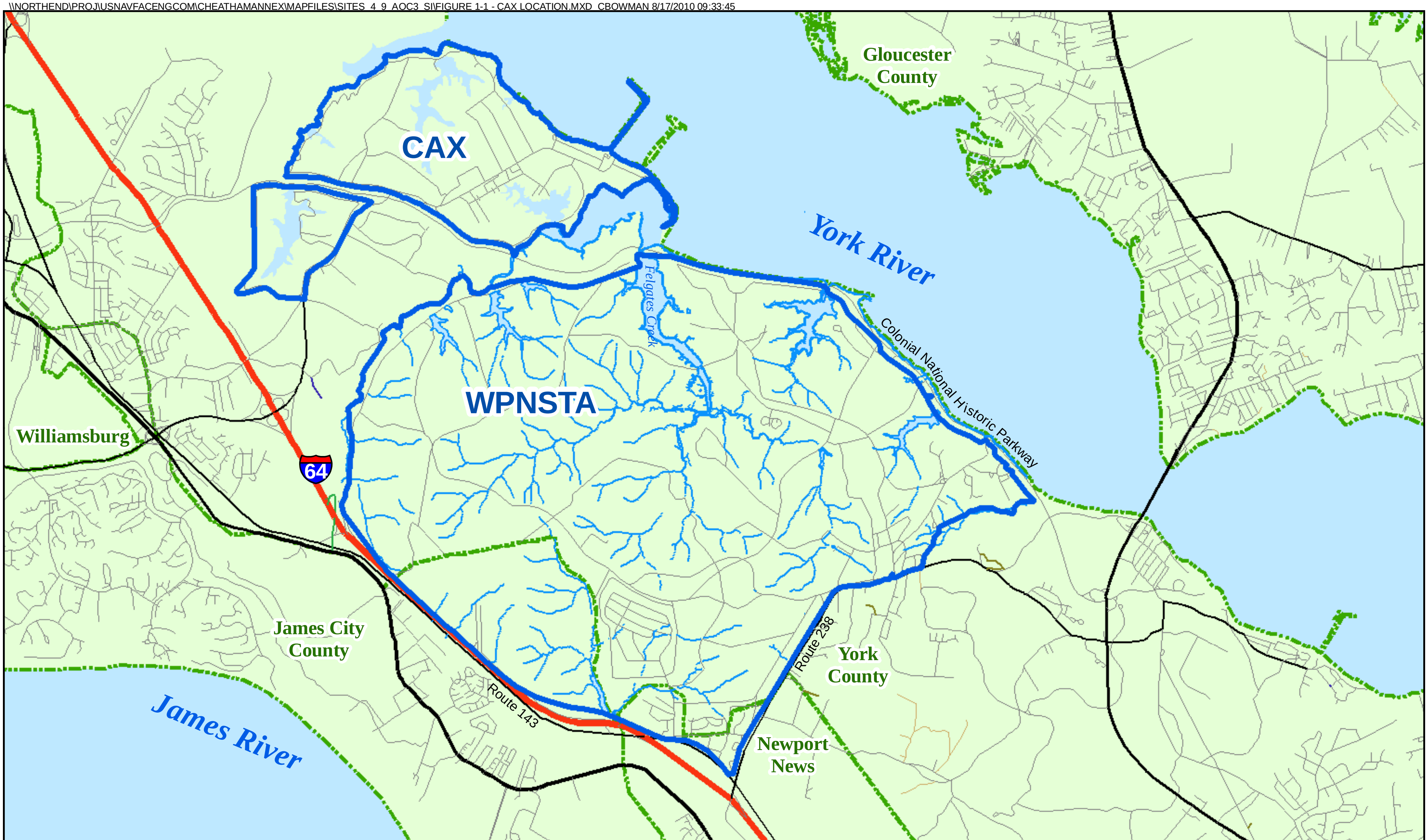
Freshwater wetlands are also present within the interior, nontidal areas of the installation.

Salinities in the York River estuary bordering CAX can be characterized as mesohaline (from 15 to 20 parts per thousand [ppt]), and can fluctuate depending on seasonal impacts, runoff, and rainfall. Of the 295 fish species known from the Chesapeake Bay, only 32 are year-round residents. Nursery areas, foraging areas, and spawning ground attract the remaining species from the Atlantic Ocean and freshwater tributaries each year. In the York River, resident fish include hogchoker, weakfish, and oyster toadfish. Spot and croaker are common in nursery and foraging areas in the summer and numerous anadromous and catadromous fish use the area during migration, including the alewife, American eel, American shad, blueback herring, striped bass, and white perch. Commercially and recreationally important species from the York River include American shad, bay anchovy, blue crab, bluefish, croaker, spot, striped bass, summer flounder, and weakfish. The York River in the vicinity of CAX is a designated crab pot fishery from March through November of each year; immediately north of CAX is a spawning and nursery ground for blue crabs. Several species of endangered sea turtles (namely the green, hawksbill, leatherback, loggerhead, and Kemp's Ridley) are known to feed in the Chesapeake Bay and occasionally forage in the York River, including in the vicinity of CAX during the summer.

The York River is designated as Essential Fish Habitat (EFH) for three species of fish managed by the Mid-Atlantic Fishery Management Council—summer flounder, bluefish, and butterfish. Though both the bluefish and butterfish use the more open, pelagic waters characteristic of the river, juvenile summer flounder often use unvegetated nearshore sandy bottoms and salt marsh creeks as nursery areas. Other species likely to use salt marsh creeks include anchovies, blue crabs, juveniles of migratory species, hard and soft-shell clams, killifish, minnows, mummichogs, oysters, silversides, and weakfish.

No known federally or state-listed endangered or threatened species are currently using CAX habitats. Suitable habitat exists on CAX for both the red-cockaded woodpecker (federally endangered) and the bald eagle (formerly federally threatened and still protected by the Bald and Golden Eagle Protection Act and state threatened/endangered). Bordering the CAX property is the York River, which provides seasonal habitat for federally and state endangered Kemp's Ridley sea turtles and federally threatened loggerhead sea turtles. The shoreline along the York River may also provide habitat for federally threatened piping plovers. Rare resources and communities identified from CAX in the Virginia Department of Conservation and Recreation (VDCR) Natural Heritage Program database and the CAX Natural Heritage Inventory include a significant great blue heron colony, low salt marsh and salt scrub habitats, coastal plain depression ponds, nonriverine wet hardwood forests, and coastal plain calcareous seepage swamps (Baker, 2005a).

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 1-1 - CAX LOCATION.MXD CBOWMAN 8/17/2010 09:33:45



Legend
Activity Boundaries
City/County Boundaries

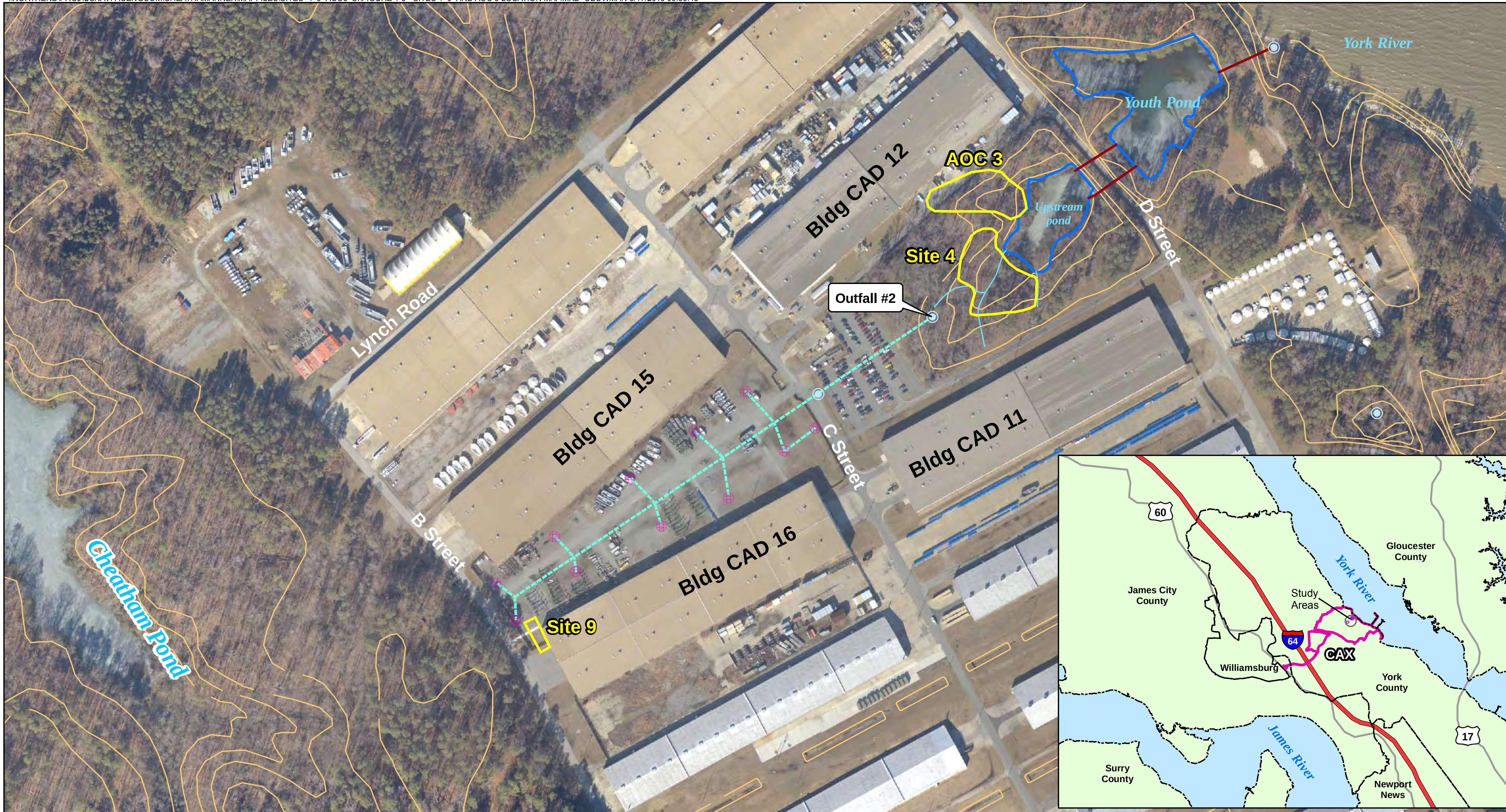
N

0 0.6 1.2 Miles

Figure 1-1
Location of CAX
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 1-3 - SITES 4_9_AND AOC 3 LOCATION MAP.MXD CBOWMAN 8/17/2010 09:36:43



Legend

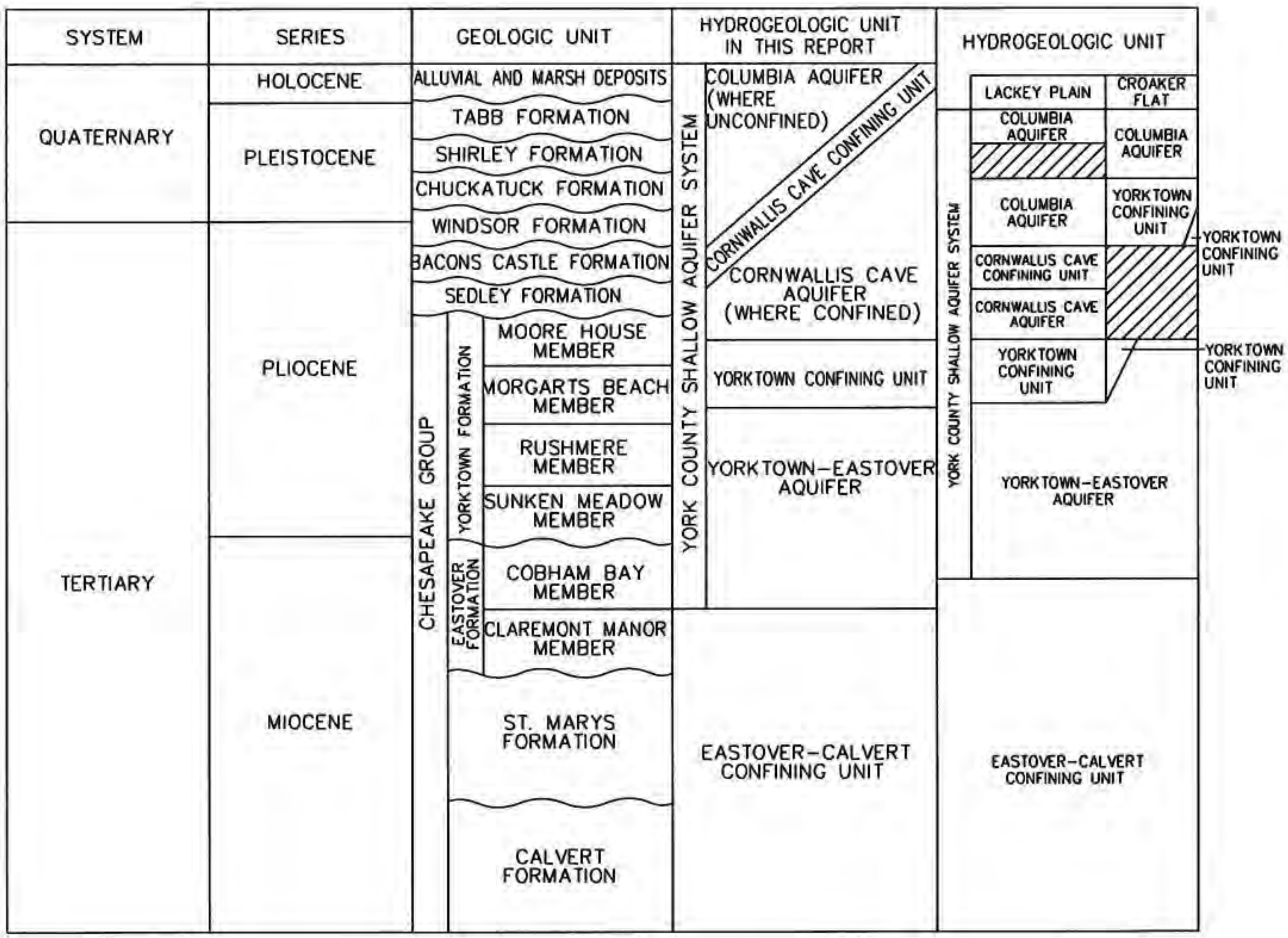
- Outfall
- Drop-In Boxes
- Drainage Channels
- Storm Water Line
- Culvert
- Elevation Contours
- Study Area Boundary
- Water Body

N

0 250 500 Feet

Figure 1-2
Sites 4, 9, and AOC 3 Location
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL



Source: Brockman, ET AL 1997 GEOHYDROLOGY OF THE SHALLOW AQUIFER SYSTEM,
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA

Figure 1-3
Geologic Units in York County
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

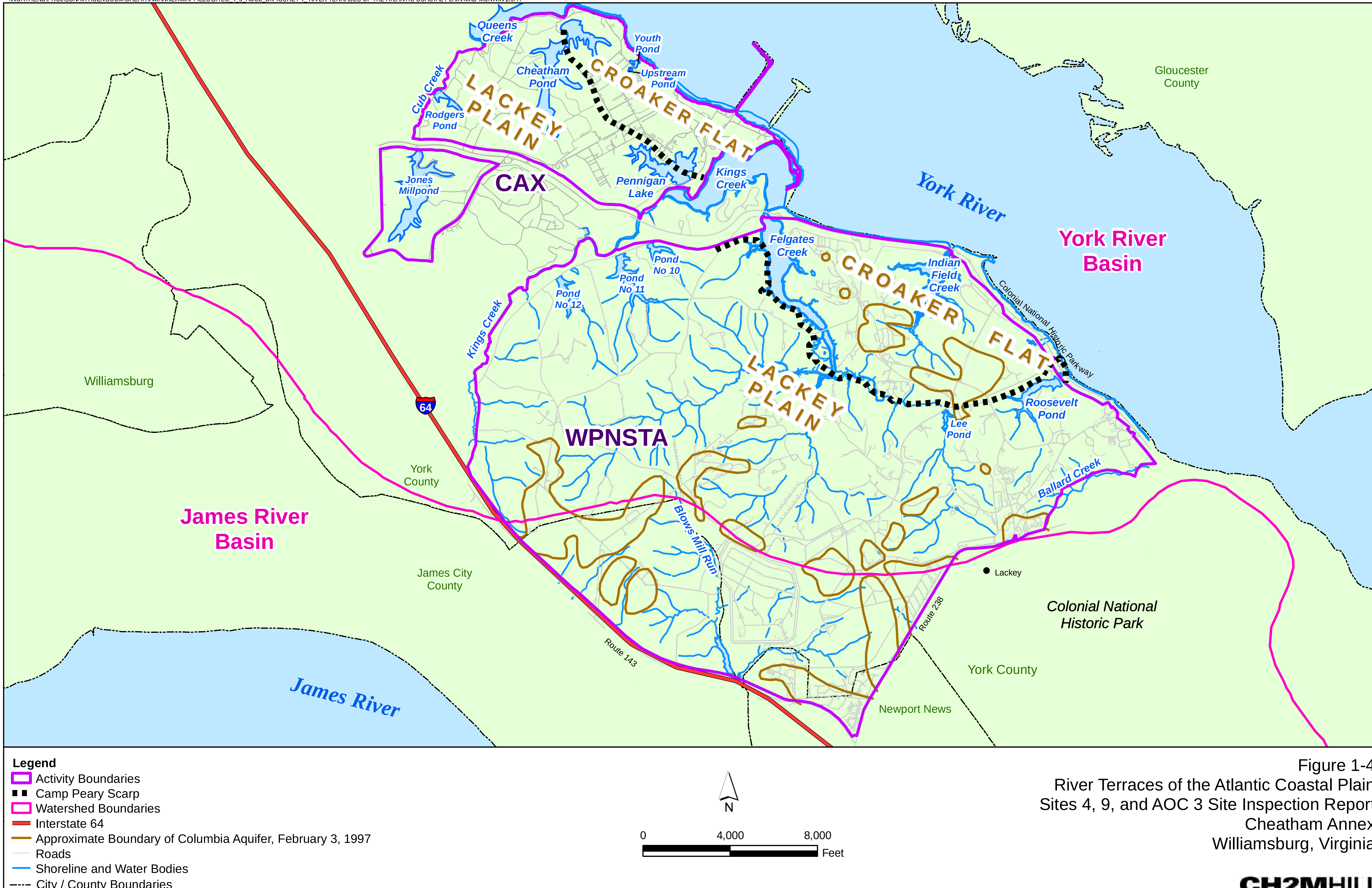
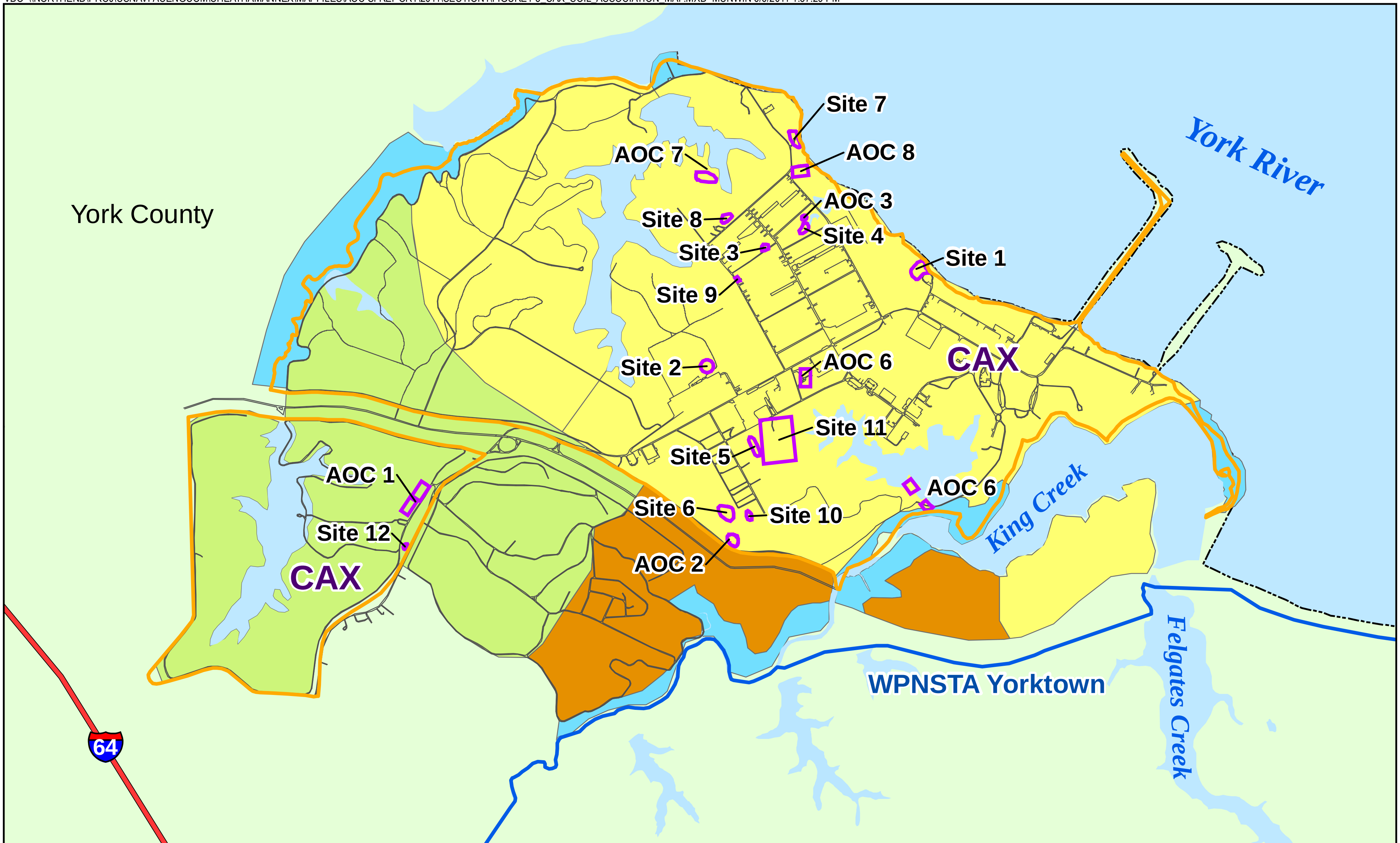


Figure 1-4
River Terraces of the Atlantic Coastal Plain
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

VBO \\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\AOC SI REPORT\2011\SECTION1\FIGURE1-5_CAX_SOIL_ASSOCIATION_MAP.MXD MUNWIN 6/6/2011 1:57:29 PM



Legend

Cheatham Annex Soil Associations

- Bohicket, Johnson, and Axis (1)
- Dogue, Pamunkey, and Uchee (2)
- Slagle, Emporia, and Craven-Uchee Complex (3)
- Emporia, Emporia Complex, Kempsville, and Craven-Uchee Complex (4)

- Site Boundaries
- CAX Boundary
- WPNSTA Yorktown Boundary

N W E S

0 1,250 2,500 Feet

Figure 1-5
General Soil Association Map
Sites 4, 9, and AOC 3
Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

SECTION 2

Investigation Methodology

This section summarizes the field investigation procedures of the SI conducted at Site 4, Site 9, and AOC 3 between October and December 2009. The 2009 SI field activities were conducted in accordance with the SAP (CH2M HILL, 2009a) and the *Master Project Plan, Naval Weapons Station Yorktown, Yorktown, Virginia and Cheatham Annex Williamsburg, Virginia* (Baker, 2005b).

Table 2-1 summarizes the environmental data collected by Site, medium, analyses performed, sample nomenclature, and sample depth during both previous investigations and the 2009 SI field activities at Site 4, Site 9, and AOC 3. Environmental data collected during the 2009 SI field activities include the following:

- **Site 4 –** Test pitting, soil sampling, temporary monitoring well installation and groundwater sampling, and surface water and sediment sampling (**Figures 2-1 through 2-3**)
- **Site 9 -** Soil sampling, temporary monitoring well installation and groundwater sampling, and sediment sampling (**Figures 2-4 and 2-5**)
- **AOC 3 -** Test pitting, soil sampling, temporary monitoring well installation and groundwater sampling, and surface water and sediment sampling (**Figures 2-6 through 2-8**)

2.1 Pre-Investigation Activities

Prior to the 2009 SI field investigation activities, an underground utility clearance was conducted at each Site by C3 Communication & Construction Corporation of Hampton, Virginia.

2.2 Waste Delineation and Test Pitting

Test pitting activities were conducted between October 27 and 30, 2009 to determine the nature and extent of buried debris present at Site 4 and AOC 3. No test pits were advanced at Site 9 because reported historic site use and the results of previous investigations did not indicate the presence of buried debris (Baker, 2005a). All test pitting activities were conducted in accordance with the Standard Operating Procedure (SOP) entitled *Test Pit and Trench Excavation* (CH2M HILL, 2009a).

Test pitting activities at Site 4 were conducted to delineate the northern edge of buried debris. The extent of buried debris at the remaining boundaries was previously characterized as part of the *Final Trenching Letter Report Site 1, Site 4, and AOC 2, Naval Weapons Station Yorktown Cheatham Annex Site, Williamsburg, Virginia* (Baker, 2002). The initial two test pit locations were agreed to by the Partnering Team prior to mobilization; however the exact test pit locations were field-determined based on observed Site conditions. Test pitting was discontinued after both excavated test pits were free of waste.

Test pitting activities at AOC 3 began within the approximate area of ground scarring observed in a 1955 aerial photograph (**Figure 2-9**) collected as part of the Aerial Photographic Analysis study, commonly referred to as the Environmental Photographic Interpretation Center (EPIC) study (USEPA, 1998). Initial test pit locations were agreed to by the Partnering Team prior to mobilization. Exact sampling locations were field-determined based on observed Site conditions. When buried material was encountered, additional test pits were excavated at locations radiating outward from the original test pit location to determine the lateral and horizontal extent of waste. In total, 24 test pits were advanced at AOC 3.

Test pitting was conducted using a large track hoe with a 27-inch bucket capable of digging to a depth of approximately 8 feet. Test pits ranged from 3 to 8 feet in depth and averaged 6 feet in length. Test pits were advanced until clean native soil was confirmed, the limits of the track hoe reach were exceeded, or the water table was encountered. Soils and waste streams encountered during test pitting were characterized and logged in accordance with the Unified Soil Classification System (USCS) by a qualified geologist. During excavation, organic vapors within the test pits were monitored with a photoionization detector (PID). Any responses from the PID were noted in the field book and test pit log. Test pit logs and associated photographs are provided within **Appendices C and D** of this report, respectively. Following excavation, all soil and waste encountered was placed back into the associated test pit, compacted, and regraded. Summaries and discussions of the test pit investigation activities are included in **Section 3** (Site 4) and **Section 5** (AOC 3).

2.3 Soil Sampling

Co-located surface and subsurface soil samples were collected at five locations at Site 4, five locations at Site 9, and ten locations at AOC 3 between October 29 and November 5, 2009, in order to determine if site soil had been adversely impacted by historical site use. Preliminary sample locations were agreed upon by the Partnering Team prior to mobilization based on existing analytical results, potential site risks, and transport mechanisms. Exact sample locations were field-determined based on observed site conditions. All soil sampling activities were conducted in accordance with the SOP entitled *Shallow Soil Sampling* (CH2M HILL, 2009a). Any deviations from the SI SAP are listed at the end of this subsection. Locations of soil samples collected during the investigation activities are included in site-specific **Sections 3 through 5**.

Soil samples were collected using either a hand auger or a drill rig that was also mounted with direct push technology (DPT) equipment. The DPT drill rig used a hollow-stem auger macrocore system with 4-foot acetate sleeves that encapsulate the captured soil. Generally, surface soil samples were collected from 0 to 0.5 feet below ground surface (bgs), while subsurface samples were collected from 0.5 to 2 feet bgs. In addition, four deep subsurface soil samples (co-located with surface and shallow subsurface samples) were collected from the first 0 to 0.5 feet interval beneath identified debris at locations that appeared to be most impacted. The purpose of these additional subsurface samples was to determine the potential for vertical migration of contaminants from the associated debris. Soil borings were monitored with a PID for organic vapors during sample collection. No PID readings above background were observed during sampling.

All soil samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), selective ion monitoring (SIM) polycyclic aromatic hydrocarbons (PAHs), TCL PCBs, Target Analyte List (TAL) total metals, cyanide, total organic carbon (TOC), pH, and grain size. Directly following the collection of the soil core by the drill rig or hand auger, VOC samples were prepared first by pushing the EnCore sampler directly into the soil from the hand auger or acetate sleeve to fill the sampler with soil from the target interval. After the VOC samples were collected, the remainder of the collected soil was homogenized in a stainless steel bowl and then transferred to the appropriate laboratory-provided sample containers for all other sample analytes. After preparation, samples were packed on ice and shipped to the laboratory for analysis at the end of each day in accordance with the SOP entitled *Sample Preservation* (CH2M HILL, 2009a). A summary of the samples collected is provided the sample summary table (**Table 2-1**).

2.4 Groundwater Sampling

Temporary monitoring wells were installed and sampled at four locations at Site 4, four locations at Site 9, and five locations at AOC 3 between October 27 and November 5, 2009 in order to determine if site groundwater had been adversely impacted by historical site use. Preliminary sample locations were agreed upon by the Partnering Team prior to mobilization based on existing analytical results, potential site risks, and transport mechanisms. Exact sample locations were field-determined based on observed site conditions. Well installation and sampling activities were conducted in accordance with applicable SOPs as listed below. Locations of well points installed during the investigation activities are shown in site-specific **Sections 3** through **5**.

2.4.1 Temporary Monitoring Well Installation

Before well installation, a DPT drill was used to collect continuous macro core soil cores in 4 feet acetate sleeves. Soil borings were characterized and logged in accordance with the USCS by a qualified geologist. During macrocore collection, soil borings were scanned with a PID for organic vapors. Any readings from the PID were logged on the soil boring log. A boring log was created for each well point location and can be found in **Appendix E**.

At each site, temporary monitoring wells were installed within the uppermost aquifer (Yorktown Eastover aquifer). Temporary monitoring wells were installed at total depths ranging between 15 and 24 feet bgs, terminating at 10 feet below the water table as observed during logging of soil cores. Well points were constructed with 5 feet segments of one-inch inner diameter polyvinyl chloride (PVC) casing with 10 feet of 0.010-inch machine-slotted screen surrounded by a pre-installed sand filter pack. The well points, set within 2-inch outer diameter temporary casings, were driven with disposable end points to the desired depth. After the well points were set, the outer casings were removed, leaving only the temporary monitoring well and disposable end point in the ground. The bore holes were allowed to cave-in around the temporary monitoring wells. Well installation activities were conducted in accordance with the SOP entitled *Monitoring Well Installation* (CH2M HILL, 2009a).

Descriptions of the deviations from the SAP at each site are discussed below:

- Boring log records deviated from the specifications of the SOP entitled *Field Logbook* (CH2M HILL, 2009a). Boring logs were recorded on individual log sheets instead of in a field logbook. One boring log, for well point CAS04-MW01, was absent following the completion of field activities; however, it is unlikely this impacted the quality of the data collected from this well.
- The installation of the well points deviated from the specifications of the SAP (CH2M HILL, 2009a). The screened well intervals were driven to 10 feet beyond where groundwater was first encountered during logging of soil cores instead of to the top of the Yorktown-Eastover Confining Unit, as specified in the SAP. This modification to the SAP was made in order to capture samples most likely to be impacted by potential contamination leaching from surface debris, buried debris, and soil.

2.4.2 Water Level Survey

Depth-to-water measurements from all monitoring wells at Sites 4, 9, and AOC 3 were obtained on November 4, 2009 after all temporary monitoring wells had been installed and water levels had been allowed to equilibrate for at least 24 hours. An electronic water-level meter was used to measure the depth-to-water from ground surface at each monitoring well. All groundwater elevation measurements were acquired in accordance with the SOP entitled *Water-Level Measurement* (CH2M HILL, 2009a). Water-level measurements are presented in **Table 2-2**.

2.4.3 Temporary Monitoring Well Development

Prior to sampling, all temporary monitoring wells were developed in order to restore the permeability of the soil surrounding the well, which may have been reduced by the drilling operations, and to remove fine-grained materials that may have entered the well during installation. Development was completed using a peristaltic pump, lined with disposable Masterflex tubing, and disposable Teflon-lined polyethylene tubing placed at the bottom of the monitoring well. The tubing was lifted and lowered, similar to a surging technique, as measured turbidity began to decline in order to suspend and remove any excess sediment that may have accumulated at the bottom of the well point.

Well development continued until water quality parameters (pH, oxidation-reduction potential [ORP], temperature, conductivity, turbidity, and dissolved oxygen [DO]) measured by a Horiba U-22 meter stabilized for at least three consecutive readings or three well volumes had been removed and turbidity had been reduced to the extent practicable. All well development activities were conducted in accordance with the Field Measurement SOP and the SOP entitled *Monitoring Well Installation* (CH2M HILL, 2009a).

Descriptions of the deviations from the SAP at each site are discussed below:

Development of the monitoring wells deviated from the specifications of the SOP entitled *Monitoring Well Installation* (CH2M HILL, 2009a). Backwashing was not conducted as part of well development, as the well was fitted with a pre-installed sand filter pack. Instead, tubing was lifted and lowered throughout development in order to suspend and clear out as much sediment as possible from within the well prior to sampling.

2.4.4 Groundwater Sampling

Groundwater samples were collected from each of the 13 temporary monitoring wells in accordance with the SOP entitled *Low-Flow Groundwater Sampling from Monitoring Wells* (CH2M HILL, 2009a) in order to minimize drawdown and to obtain a sample representative of groundwater conditions in the surrounding geologic formation. Prior to groundwater sample preparation, temporary monitoring wells were purged in order to remove any stagnant water that may have accumulated within the well. Purging was completed using a peristaltic pump, lined with disposable Masterflex tubing, and Teflon-lined polyethylene tubing placed at the middle of the screened interval. Well purging continued until water quality parameters measured by a Horiba U-22 stabilized or three well volumes had been removed and turbidity had been reduced to the extent practicable. Following parameter stabilization, a CHEMets kit was used to confirm DO readings measured by the Horiba meter. Once DO confirmation was recorded, a groundwater sample was collected at the temporary monitoring well. The final set of groundwater quality measurements obtained before sample collection for each well point is presented in **Table 2-3**.

All groundwater samples were analyzed for TCL VOCs, TCL SVOCs, SIM PAHs, TCL pesticides/PCBs, and TAL total and dissolved metals, mercury, and cyanide. Groundwater for the analytical samples was pumped through the tubing directly into the appropriate laboratory provided bottleware, with the exception of filtered metals. Groundwater collected for dissolved metals analyses was pumped through a 0.45 µm filter and then directly into the sample bottleware. After preparation, samples were packed on ice and shipped to the laboratory for analysis at the end of each day in accordance with the SOP entitled *Sample Preservation* (CH2M HILL, 2009a). A summary of the samples collected is provided in the sample summary table (**Table 2-1**).

2.4.5 Temporary Monitoring Well Abandonment

Temporary monitoring wells were abandoned immediately following groundwater sampling at each well. The PVC portion of the well was pulled from the ground using the DPT rig and the disposable end points were left in place. The PVC casing was broken down, decontaminated, and disposed of as non-hazardous solid waste. Following well point removal, the remaining void was filled with bentonite chips to the ground surface.

2.5 Surface Water Sampling

Surface water samples, co-located with sediment samples, were collected at nine locations at Site 4 and four locations at AOC 3 in order to determine if site surface water had been adversely impacted by historical site use. Sampling locations were jointly selected by the Navy and the Biological Technical Assistance Group (BTAG) in the field. Locations were selected in depositional areas where contaminant impacts to the water bodies were most likely. All surface water sampling activities were conducted in accordance with the SOP entitled *Surface Water and Sediment Acquisition* (CH2M HILL, 2009a). Locations of surface water and sediment samples collected during the investigation activities are shown in site-specific **Sections 3** and **5.**

Downstream locations were sampled first, with subsequent samples collected moving upstream, from north to south, in order to avoid disturbing bottom sediments that would create turbid surface water. Prior to surface water sample collection, water quality data were measured with a Horiba U-22 meter. In areas where sufficient depth of standing water was present, water quality measurements were collected from the top, middle, and bottom of the water column. Surface water quality measurements are presented in **Table 2-4**.

One surface water sample was collected at each location and analyzed for TCL VOCs, TCL SVOCs, SIM PAHs, TCL pesticides/PCBs, TAL total and dissolved metals, cyanide, and hardness. The samples collected from within Upstream Pond were also analyzed for acid volatile sulfide/simultaneously extractable metals (AVS/SEM). All samples were collected by submerging a clean amber glass bottle in the surface water with the mouth pointed upstream and the bottle tilted slightly downstream. Samples were then transferred from the amber bottle to appropriate laboratory-prepared bottleware. VOC samples were prepared first by filling the sample containers so that no air bubbles remained in order to prevent volatilization of contaminants to the headspace. After the VOC samples were prepared, the remaining sample analytes were transferred directly into the appropriate laboratory-provided bottleware, with the exception of dissolved metals. Surface water for dissolved metals analysis were pumped using a peristaltic pump through a 0.45-micron (µm) filter prior to transferring the sample into bottleware. After preparation, surface water samples were packed on ice and shipped to the laboratory for analysis daily in accordance with the SOP entitled *Sample Preservation* (CH2M HILL, 2009a). A summary of the samples collected is provided in the sample summary table (**Table 2-1**).

Descriptions of the deviations from the SAP at each site are discussed below:

- Some sample locations within Upstream Pond deviated from the specifications of the SAP (CH2M HILL, 2009a). The preliminary sample locations agreed upon in the SAP placed two surface water samples at the outfalls of two culverts believed to run underneath D Street. However, during inspection of the site, these culverts and outfalls could not be located. As a result, a single sample was collected from the midpoint between the two originally proposed sample locations.
- Surface water samples were not collected from Site 9 due to the lack of standing water in the drainage ditches.

2.6 Sediment Sampling

Co-located surface and subsurface sediment samples, also co-located with surface water sampling locations, were collected from nine locations at Site 4 and four locations at AOC 3 in order to determine if site sediment had been adversely impacted by historical site use. Three co-located surface and subsurface sediment samples were collected from Site 9; however, due to a lack of standing water in the drainage ditches at Site 9, no co-located surface water samples were collected. Sampling locations were jointly selected by the Navy and the BTAG in the field. Locations were placed in depositional areas where contaminant impacts to the water bodies were most likely. All sediment sampling activities were conducted in accordance with the SOP entitled *Surface Water and Sediment Acquisition* (CH2M HILL, 2009a). Locations of surface water and sediment samples collected during the investigation activities are shown in site-specific **Sections 3** through **5.**

Each sediment core approximately 12-inches in length was collected using a sediment/ sludge sampler and a description was logged by a qualified geologist. Surface sediment samples were collected from 0 to 4 inches bgs, while subsurface sediment samples were collected from a depth of 4 to 8 inches bgs.

All sediment samples were analyzed for TCL VOCs, TCL SVOCs, SIM PAHs, TCL pesticides/PCBs, TAL metals, cyanide, TOC, pH, and grain size. Following sediment core collection, VOC and AVS/SEM samples were collected first by pushing the bottleware directly into the core sediment at the target interval. After the VOC and AVS/SEM samples were collected, the remainder of the sediment was homogenized in a stainless steel bowl and then transferred to the appropriate laboratory-provided sample containers for all other sample analytes. After preparation, surface water and sediment samples were packed on ice and shipped to the laboratory for analysis daily in accordance with the SOP entitled *Sample Preservation* (CH2M HILL, 2009a). A summary of the samples collected is provided in the sample summary table (**Table 2-1**).

Descriptions of the deviations from the SAP at each site are discussed below:

- The location of some samples within Upstream Pond deviated from the specifications of the SAP (CH2M HILL, 2009a). The preliminary sample locations agreed upon in the SAP placed two sediment samples at the outfalls of two culverts believed to run underneath D Street. However, during inspection of the site, these culverts and outfalls could not be located. As a result, a single sample was collected from the midpoint between the two originally proposed sample locations.

2.7 Surveying Activities

Sampling and test pit locations were field-determined based on preliminary sample locations agreed upon by the Partnering Team in conjunction with field observation prior to mobilization and were staked at the time of sample collection. A stake was placed at the location of each soil, surface water, sediment, and groundwater sample, as well as each test pit corner. Following the completion of all sampling activities, the locations were surveyed using a Real-Time Kinematic (RTK) global positioning system (GPS) by the surveying subcontractor, Michael Surveying & Mapping. The RTK GPS method has an expected horizontal and vertical accuracy of ±0.03 feet. Relative horizontal accuracy for the GPS surveys conformed to the *Federal Geodetic Control Subcommittee Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy* (FGDC, 1998), assuring accuracy at the 95 percent confidence level of the horizontal coordinates to the nearest 1 foot. Horizontal Northing and Easting coordinate values were recorded in Virginia State Plane Coordinate System, South Zone (North American Vertical Datum [NAVD] 88 datum), with units expressed in United States Survey Feet. All survey data for sample and test pit locations for each site are located in **Appendix F**.

2.8 Decontamination Procedures

All decontamination activities were conducted in accordance with the SOP entitled *Decontamination of Drilling Rigs and Equipment* and the SOP entitled *Decontamination of Personnel and Equipment*, as applicable (CH2M HILL, 2009a). Disposable sampling equipment and personal protective equipment (PPE), such as Masterflex tubing and nitrile gloves, were treated as non-hazardous solid waste. After use, equipment was placed in plastic contractor bags and disposed of in an onsite trash dumpster. Non-disposable sampling equipment, such as a hand auger, was decontaminated prior to each use.

Reusable, heavy equipment (e.g., drilling rods and augers) was decontaminated before and in between the collection of each sample using a high-pressure steam cleaner with potable grade water. Pressure washing was conducted at the temporary decontamination pad, which had been constructed at Environmental Restoration (ER) Site 7 prior to mobilization. The decontamination pad consisted of a raised wood-frame lined with a high-density polyethylene tarp, which acted as a basin to collect fluids. These fluids were then pumped into a 55-gallon drum to await characterization and disposal. All heavy equipment decontamination procedures were conducted in accordance with the SOP entitled *Decontamination of Drilling Rigs and Equipment* (CH2M HILL, 2009a).

Reusable sampling equipment (e.g., split-spoons, sampling trowels, etc.) was decontaminated using the following procedure:

1. Rinse equipment with potable water
2. Wash equipment with distilled water and Liquinox solution using a brush to remove any particulate matter or surface film
3. Rinse equipment with potable water
4. Rinse with distilled or potable water and methanol solution
5. Rinse equipment with distilled water and allow to air dry
6. Wrap exposed areas with aluminum foil for transport and handling if not used immediately following decontamination

Water generated during decontamination of sampling equipment was collected and transferred to a 55-gallon drum to await characterization and disposal.

2.9 Investigation-derived Waste Management

IDW generated during the SI included well development groundwater and groundwater sampling purge water, as well as decontamination rinse water from non-disposable sampling equipment and heavy equipment. IDW was containerized in approved 55-gallon drums, stored on secondary containment at the approved IDW staging location at Site 7, and properly labeled. In total, three 55-gallon drums of aqueous IDW were generated during investigation activities.

Prior to disposal, one composite sample was collected from all aqueous drums by CH2M HILL field staff. The IDW sample was analyzed for full TCLP analysis, ignitability, reactive cyanide, reactive sulfide, and corrosivity. The sample was collected by submerging a clean amber glass bottle in the aqueous IDW and then transferring the sample from the amber bottle to the appropriate laboratory-prepared bottleware. Based on the analytical results, all IDW was identified as non-hazardous and the IDW was disposed of by Soilex Corporation at the company's approved disposal facility located in Chesapeake, VA within 90 days of generation. All IDW management activities were conducted in accordance with the IDW Management Plan (Baker, 2005b). An analytical summary for the IDW sample collected is provided in **Table 2-5**. Laboratory analytical data for the IDW sample is presented in **Appendix G**. IDW handling and disposal information are included in **Appendix H.**

2.10 Data Quality Evaluation

2.10.1 Data Quality Assessment

This data quality summary assesses the effect of the overall analytical process on the "availability" of the analytical data for use by the project team.

The three major categories of data evaluation are laboratory performance, field collection performance (i.e. blank contamination), and matrix interference. Evaluation of laboratory performance is a check for the laboratory's compliance with the method requirements. Additionally, an independent, third-party validator conducts a review of the laboratory data to assess whether the analytical methods were within required control limits. Evaluation of field collection performance, such as blank contamination and field duplicates, involves the review of field quality control (QC) samples and the determination of their effect on the sample results. Evaluation of potential matrix interferences involves the review of several areas of results, including surrogate spike recoveries and matrix spike (MS)/matrix spike duplicate (MSD) sample results.

An independent third-party data validator (Environmental Data Services) reviewed all data packages using the validation criteria outlined in the SAP (CH2M HILL, 2009a). If adherence to QA/QC criteria yielded deficiencies, data was considered for qualification. The data qualifiers were those presented in *EPA CLP Region III Modifications to National Functional Guidelines for Organic Data Review: Multi-Media, Multi-Concentration* (USEPA, 1994) and *EPA CLP Region III Modifications to National Functional Guidelines for Inorganic Data Review* (USEPA 1993). These guidelines weren't used for data validation; however, the specific qualifiers listed therein may have been applied to data should non-conformances against the QA/QC criteria be identified.

In general, the data validator examines each data point and determines any effects that QC exceedances may have had. The following qualifiers may be applied to results:

- **J** - Concentration estimated. The analyte was positively identified and the associated numerical value is the approximate concentration of the parameter in the sample. Often, a J-qualifier is applied when the result was less than the quantitation limit (QL).
- **U** - Not detected. Sample was analyzed for this analyte, but it was not detected at greater than the QL.
- **UJ** – Not detected, QL estimated. Sample was analyzed for this analyte, but it was not detected above the QL. The QL for this parameter is estimated due to a quality control exceedance.
- **R** – Rejected/ unreliable. The result was rejected because QC limits were exceeded. The presence or absence of the parameter cannot be verified and the result is not usable.
- **K -** Detected. Analyte is present but the result may be biased high. The actual result may be lower than the reported result.

- **L -** Detected. Analyte is present but the result may be biased low. The actual result may be higher than the reported result.
- **UL –** Not detected. The QL is probably higher than what was reported.
- **[No qualifier present] -** Detected. Qualification was not warranted.

See **Table 2-6** for a description of data validation qualifiers that were applied to one or more analytical results.

2.10.2 Data Usability

As shown in **Table 2-6**, several results were R-qualified by the data validator due to low MS/MSD recoveries, low internal standard recoveries, low Laboratory Control Sample (LCS), and/or low continuing calibration verification recoveries. The specific samples and analytes that were R-qualified can be found in **Table 2-7**. Very low or zero percent MS and/or MSD recoveries were present for some samples; there may be interferences present in the sample matrix that caused target analytes to recover at lower concentrations than what's present in the sample. There were also very low or zero percent LCS recoveries for several samples. This was the most common cause for rejection of data. The LCS evaluates the lab's ability to recover a known amount of a substance from a clean matrix. Additionally, there were several very low or zero percent recoveries for internal standards. Internal standards are substances that are introduced in known amounts into each calibration standard, field sample, and QC sample. The ratio of the analyte signal to the internal standard signal is used to determine the analyte concentrations. A poor internal standard recovery suggests precision issues. Continuing calibration verification recoveries evaluate the instrument's ability to provide accurate/ non-biased results. R-qualifications for continuing calibration were due to low relative response factors (RRFs) and high differences relative to the initial calibration response. All R-qualified results are considered unreliable and should not be used by the project team for making decisions.

Blank contamination present in laboratory and field-associated blanks resulted in B-qualification of 2.71 percent of the data. Blank contamination was most prevalent in total and dissolved metals results. Approximately 58 percent of dissolved metals B-qualifications can be attributed to contamination in laboratory blanks (method blanks, calibration blanks, etc.). The remaining B-qualifications can be attributed to field blanks and equipment rinseate blanks. Approximately 86 percent of total metals B-qualifications can be attributed to contamination in laboratory blanks. Blank contamination was also present for AVS/SEM, SVOC, and VOC analysis; approximately 65 percent of B-qualifications for these analytical groups can be attributed to laboratory blank contamination. However, it should be noted that although the qualifications were made based on the laboratory blank's concentration (or vice-versa), there may have been field blank contamination that was associated with that sample as well, but at a lower concentration. B-qualified results are available for use by the project team as non-detects at the reported concentrations and are listed in **Table 2-7**.

2.10.3 Impacts on Precision, Accuracy, Representativeness, Completeness, Comparability (PARCC)

Precision

Precision is defined as the agreement between duplicate results, and was characterized by comparing MS/MSD relative percent differences, serial dilutions, laboratory replicates, and field duplicate sample results. For this data set, precision was also assessed by examining dual-column reproducibility (percent difference between instrument columns) for pesticides and PCBs. Although results may have been qualified due to QC exceedances that may suggest an impact on precision, there is no actual significant negative impact on precision unless a data point is deemed unusable (rejected) due to precision exceedances. Rejected data that had a negative impact on precision includes several SVOC, VOC, and AVS/SEM results which had low MS/MSD recoveries and several VOC results which had low internal standard recoveries.

Accuracy/Bias

Accuracy/bias is a measure of the agreement between an analytical determination and the true value of the parameter being measured. For organic analyses, each sample was spiked with surrogate compounds; and for organic and inorganic analyses, an MS/MSD and LCS were spiked with a known parameter concentration before preparation. Internal standards, surrogates and MS/MSDs provide a measure of the matrix effects on the analytical accuracy. The LCS demonstrates accuracy of the method and the laboratory's ability to meet the method criteria. Accuracy/bias is also assessed by calibration recoveries. Although results may have been qualified due to QC exceedances that may suggest an impact on accuracy/bias, there is no actual significant negative impact on accuracy unless a data point is deemed unusable (rejected) due to accuracy exceedances. Rejection of results may have a negative impact on accuracy/bias due to low or zero percent MS and/or MSD recoveries, low continuing calibration recoveries, low or zero percent LCS recoveries, and low internal standard recoveries.

Representativeness

Representativeness is a qualitative measure of the degree to which sample data accurately and precisely represent a characteristic environmental condition (in this case, the nature and extent of contamination). Representativeness is a subjective parameter and is used to evaluate the efficacy of the sample planning design. In terms of data quality, representativeness was assured because the sampling team followed approved SOPs for sample collection and handling, and the laboratory followed approved SOPs for sample handling, preparation, and analysis.

Completeness

Completeness is calculated as the number of analytically-sound results that are available for use compared to the total number of measurements made. All results except those R-qualified as "rejected" are available for use as analytically-sound results. The R-qualifier is the only qualifier that negatively affects a data point's availability. A completeness goal was not specified in the SAP; therefore, a general 95 percent completeness goal was applied. Overall, the entire data set was 99.45 percent complete and the goal was met.

Comparability

Comparability is a qualitative measure designed to express the confidence with which one data set may be compared to another. Factors that affect comparability are sample collection and handling techniques, sample matrix, and analytical methods. In this case, because approved SOPs were used for sample collection and handling, common sample matrices were evaluated (surface water, sediment, soil, and groundwater), and USEPA methods were utilized, the data user may express confidence in the fact that this data set is comparable to others of acceptable data quality. In addition, comparability is controlled by the other PARCC parameters because data sets can be compared with confidence only when precision and accuracy are known. Except in the case of rejected data, precision and accuracy were demonstrated to be acceptable, and the data user may be confident that this data set is comparable to others of high data quality.

2.10.4 Unvalidated Data

Grain Size (sieve only, no hydrometer) was analyzed by American Society for Testing of Materials Method D422. Excluding field quality control samples, 528 distinct data points were generated. Although grain size data were not third-party validated, the data were still subject to many of the verification and validation steps outlined in Worksheet 34 and 35 of the SAP. No qualifiers were applied and the grain size data set is 100 percent complete (528 of 528 grain size results are available for use).

2.10.5 Overall Assessment

All data collected during the CAX Sites 4, 9, and AOC 3 SI were found to be of acceptable quality. The data completeness goal was met with respect to the amount of data that is available for use by the project team. The project team can use these data as reported and qualified with the exception of data that was rejected due to QA/QC deficiencies.

TABLE 2-1
Sample Summary Table
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Sample ID[1]	Investigation	Matrix	Sample Interval (bgs)	VOCs		SVOCs		Pesticides		PCBs			Explosives	Metals		2,3,7,8 - TCDD	AVS/SEM	TOC	pH	Grain Size	Hardness	Collection Method	Comments
				CLP[2]	SW846 8260B	CLP[2]	SW846 8270C / 8270 SIM	CLP[2]	SW846 8081A	Unknown Method	CLP[2]	SW846 8082	8330	CLP[2]	SW846 6020 / 7470A / 7471A / 9012B	Unknown Method	USEPA 821-R-91-100	Lloyd Kahn	SW846 9045C	ASTM D422	SM 2340B		
SITE 4																							
CAS004-4HA01-00-1199	1999 Field Investigation	Surface Soil	0 - 0.5'	X		X		X			X		X	X								Hand Auger	
CAS004-4HA02-00-1199				X		X		X			X		X	X									
CAS004-4HA02D-00-1199				X		X		X			X		X	X									
CAS004-4HA03-00-1199				X		X		X			X		X	X									
CAS004-4HA04-00-1199				X		X		X			X		X	X									
CAS004-4HA05-00-1199				X		X		X			X		X	X									
CAS04-SS01-1109	2009 SI Field Activities				X		X		X			X			X			X	X	X			
CAS04-SS02-1109					X		X		X			X			X			X	X	X			
CAS04-SS03-1109					X		X		X			X			X			X	X	X			
CAS04-SS04-1109					X		X		X			X			X			X	X	X			
CAS04-SS05-1109					X		X		X			X			X			X	X	X			
CAS004-4-HA02-02-1199	1999 Field Investigation	Shallow Subsurface Soil	1-2'	X		X		X			X		X	X									
CAS004-4-HA03-02-1199				X		X		X			X		X	X									
CAS004-4-HA04-01-1199			0.5-1'	X		X		X			X		X	X									
CAS004-4-HA05-01-1199				X		X		X			X		X	X									
CAS04-SB01-1109	2009 SI Field Activities		0.5 - 2'		X		X		X			X			X			X	X	X			
CAS04-SB02-1109					X		X		X			X			X			X	X	X			
CAS04-SB03-1109					X		X		X			X			X			X	X	X			
CAS04-SB04-1109					X		X		X			X			X			X	X	X			
CAS04-SB05-1109					X		X		X			X			X			X	X	X			
CAS04-GW01-1009	2009 SI Field Activities	Groundwater	10 - 20'		X		X		X			X			X							Peristaltic Pump and Tubing	
CAS04-GW02-1009			10 - 20'		X		X		X			X			X								
CAS04-GW03-1009			9 - 19'		X		X		X			X			X								
CAS04-GW04-1009			14 - 24'		X		X		X			X			X								
CAS04-GW04P-1009			14 - 24'		X		X		X			X			X								
CAS04-SW05-1209	2009 SI Field Activities	Surface Water	At water surface		X		X		X			X			X						X	Clean Glass Amber Bottle	
CAS04-SW06-1209					X		X		X			X			X						X		
CAS04-SW07-1209					X		X		X			X			X						X		
CAS04-SW07P-1209					X		X		X			X			X						X		
CAS04-SW08-1209					X		X		X			X			X						X		
CAS04-SW09-1209					X		X		X			X			X						X		
CAS04-SD05-1209A	2009 SI Field Activities	Surface Sediment	0 - 4"		X		X		X			X			X		X	X	X	X		Hand Auger	
CAS04-SD06-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD07-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD07P-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD08-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD09-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD05-1209B	2009 SI Field Activities	Subsurface Sediment	4 - 8"		X		X		X			X			X		X	X	X	X		Hand Auger	
CAS04-SD06-1209B					X		X		X			X			X		X	X	X	X			
CAS04-SD07-1209B					X		X		X			X			X		X	X	X	X			
CAS04-SD07P-1209B					X		X		X			X			X		X	X	X	X			
CAS04-SD08-1209B					X		X		X			X			X		X	X	X	X			
CAS04-SD09-1209B					X		X		X			X			X		X	X	X	X			

TABLE 2-1
Sample Summary Table
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Sample ID[1]	Investigation	Matrix	Sample Interval (bgs)	VOCs		SVOCs		Pesticides		PCBs			Explosives	Metals		2,3,7,8 - TCDD	AVS/SEM	TOC	pH	Grain Size	Hardness	Collection Method	Comments
				CLP[2]	SW846 8260B	CLP[2]	SW846 8270C / 8270 SIM	CLP[2]	SW846 8081A	Unknown Method	CLP[2]	SW846 8082	8330	CLP[2]	SW846 6020 / 7470A / 7471A / 9012B	Unknown Method	USEPA 821-R-91-100	Lloyd Kahn	SW846 9045C	ASTM D422	SM 2340B		
SITE 9																							
CAS009-9S01-00-1286	1986 Confirmation Study	Surface Soil	Unknown							X						X						Not Documented	
CAS009-9S02-00-1286										X						X							
CAS009-9S03-00-1286										X						X							
CAS009-9S04-00-1286										X						X							
CAS009-9S05-00-1286										X						X							
CAS009-9S06-00-1286										X						X							
CAS009-9S07-00-1286										X						X							
CAS009-9S08-00-1286										X						X							
CAS009-9S09-00-1286										X						X							
CAS009-9S10-00-1286										X						X							
CAS009-9S11-00-1286										X						X							
CAS009-9S12-00-1286										X						X							
CAS009-9S13-00-1286										X						X							
CAS09-SS01-1009	2009 SI Field Activities		0 - 0.5'		X		X		X			X			X			X	X	X		DPT	
CAS09-SS02-1109					X		X		X			X			X			X	X	X		Hand Auger	
CAS09-SS03-1109					X		X		X			X			X			X	X	X			
CAS09-SS04-1109					X		X		X			X			X			X	X	X			MS/MSD
CAS09-SS05-1109					X		X		X			X			X			X	X	X			
CAS09-SS05P-1109					X		X		X			X			X			X	X	X			
CAS09-SB01-1009	2009 SI Field Activities	Shallow Subsurface Soil	0.5 - 2'		X		X		X			X			X			X	X	X		DPT	
CAS09-SB02-1109					X		X		X			X			X			X	X	X		Hand Auger	
CAS09-SB03-1109					X		X		X			X			X			X	X	X			
CAS09-SB04-1109					X		X		X			X			X			X	X	X			MS/MSD
CAS09-SB05-1109					X		X		X			X			X			X	X	X			
CAS09-SB05P-1109					X		X		X			X			X			X	X	X			
CAS09-GW01-1109	2009 SI Field Activities	Groundwater	10 - 20'		X		X		X			X			X							Peristaltic Pump and Tubing	
CAS09-GW02-1109			10 - 20'		X		X		X			X			X								
CAS09-GW03-1109			9.5 - 19.5'		X		X		X			X			X								
CAS09-GW03P-1109			9.5 - 19.5'		X		X		X			X			X								
CAS09-GW04-1109			9.5 - 19.5'		X		X		X			X			X								MS/MSD
CAS09-SD01-1209A	2009 SI Field Activities	Surface Sediment	0 - 4"		X		X		X			X			X		X	X	X	X		Hand Auger	
CAS09-SD02-1209A					X		X		X			X			X		X	X	X	X			MS/MSD
CAS09-SD03-1209A					X		X		X			X			X		X	X	X	X			
CAS09-SD01-1209B	2009 SI Field Activities	Subsurface Sediment	4 - 8"		X		X		X			X			X		X	X	X	X			
CAS09-SD02-1209B					X		X		X			X			X		X	X	X	X			MS/MSD
CAS09-SD03-1209B					X		X		X			X			X		X	X	X	X			
AOC 3																							
CAS004-4HA06-00-1199	1999 Field Investigation	Surface Soil	0 - 0.5'	X		X		X			X		X	X								Hand Auger	
CAA03-SS01-1109	2009 SI Field Activities				X		X		X			X			X			X	X	X			
CAA03-SS02-1109					X		X		X			X			X			X	X	X			
CAA03-SS03-1109					X		X		X			X			X			X	X	X			
CAA03-SS04-1109					X		X		X			X			X			X	X	X			
CAA03-SS05-1109					X		X		X			X			X			X	X	X			
CAA03-SS06-1109					X		X		X			X			X			X	X	X			
CAA03-SS07-1109					X		X		X			X			X			X	X	X			
CAA03-SS08-1109					X		X		X			X			X			X	X	X			
CAA03-SS08P-1109					X		X		X			X			X			X	X	X			
CAA03-SS09-1109					X		X		X			X			X			X	X	X			
CAA03-SS10-1109					X		X		X			X			X			X	X	X			
CAS004-4-HA06-02-1199	1999 Field Investigation	Shallow Subsurface Soil	0.5 - 2'																				
CAA03-SB01-1109	2009 SI Field Activities				X		X		X			X			X			X	X	X			
CAA03-SB02-1109A					X		X		X			X			X			X	X	X			
CAA03-SB03-1109A					X		X		X			X			X			X	X	X			
CAA03-SB04-1109A					X		X		X			X			X			X	X	X			
CAA03-SB05-1109A					X		X		X			X			X			X	X	X			
CAA03-SB06-1109					X		X		X			X			X			X	X	X			
CAA03-SB07-1109					X		X		X			X			X			X	X	X			
CAA03-SB08-1109					X		X		X			X			X			X	X	X			
CAA03-SB08P-1109					X		X		X			X			X			X	X	X			
CAA03-SB09-1109					X		X		X			X			X			X	X	X			
CAA03-SB10-1109					X		X		X			X			X			X	X	X			

TABLE 2-1
Sample Summary Table
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Sample ID[1]	Investigation	Matrix	Sample Interval (bgs)	VOCs		SVOCs		Pesticides		PCBs			Explosives	Metals		2,3,7,8 - TCDD	AVS/SEM	TOC	pH	Grain Size	Hardness	Collection Method	Comments
				CLP[2]	SW846 8260B	CLP[2]	SW846 8270C / 8270 SIM	CLP[2]	SW846 8081A	Unknown Method	CLP[2]	SW846 8082	8330	CLP[2]	SW846 6020 / 7470A / 7471A / 9012B	Unknown Method	USEPA 821-R-91-100	Lloyd Kahn	SW846 9045C	ASTM D422	SM 2340B		
CAA03-SB02-1109B	2009 SI Field Activities	Deep Subsurface Soil	15.5 - 16'		X		X		X			X			X			X	X	X		DPT	
CAA03-SB03-1109B			15.5 - 16'		X		X		X			X			X			X	X	X			
CAA03-SB04-1109B			14.5 - 15'		X		X		X			X			X			X	X	X			
CAA03-SB05-1109B			15.1 - 15.6'		X		X		X			X			X			X	X	X			
CAA03-GW01-1109	2009 SI Field Activities	Groundwater	14 - 24'		X		X		X			X			X							Peristaltic Pump and Tubing	
CAA03-GW02-1109			6 - 16'		X		X		X			X			X								
CAA03-GW03-1109			5 - 15'		X		X		X			X			X								
CAA03-GW04-1109			5 - 15'		X		X		X			X			X								
CAA03-GW05-1109			5 - 15'		X		X		X			X			X								
CAS04-SW01-1209	2009 SI Field Activities	Surface Water	At water surface		X		X		X			X			X						X	Clean Glass Amber Bottle	
CAS04-SW02-1209					X		X		X			X			X						X		
CAS04-SW03-1209					X		X		X			X			X						X		
CAS04-SW04-1209					X		X		X			X			X						X		
CAA03-SW01-1209					X		X		X			X			X						X		
CAA03-SW02-1209					X		X		X			X			X						X		
CAA03-SW03-1209					X		X		X			X			X						X		
CAA03-SW04-1209					X		X		X			X			X						X		
CAS004-4-SED01-00-1199	1999 Field Investigation	Surface Sediment	0 - 4"	X		X		X			X		X	X									
CAS004-4-SD02-00-1199				X		X		X			X		X	X								Sediment Core Sampler	
CAS004-4-SD03-00-1199				X		X		X			X		X	X									
CAS004-4-SD04-00-1199				X		X		X			X		X	X									
CAS004-4-SD04-00D-1199				X		X		X			X		X	X									
CAS04-SD01-1209A	2009 SI Field Activities				X		X		X			X			X		X	X	X	X			
CAS04-SD01P-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD02-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD03-1209A					X		X		X			X			X		X	X	X	X			
CAS04-SD04-1209A					X		X		X			X			X		X	X	X	X			MS/MSD
CAA03-SD01-1209A					X		X		X			X			X		X	X	X	X			
CAA03-SD02-1209A					X		X		X			X			X		X	X	X	X			
CAA03-SD03-1209A					X		X		X			X			X		X	X	X	X			
CAA03-SD04-1209A					X		X		X			X			X		X	X	X	X			
CAS004-4-SED01-01-1199	1999 Field Investigation	Subsurface Sediment	4 - 8"	X		X		X			X		X	X								Sediment Core Sampler	
CAS004-4-SD02-01-1199				X		X		X			X		X	X									
CAS004-4-SD03-01-1199				X		X		X			X		X	X									
CAS004-4-SD04-01-1199				X		X		X			X		X	X									
CAS04-SD01-1209B	2009 SI Field Activities				X		X		X			X			X		X	X	X	X			
CAS04-SD01P-1209B					X		X		X			X			X		X	X	X	X			
CAS04-SD02-1209B					X		X		X			X			X		X	X	X	X			
CAS04-SD03-1209B					X		X		X			X			X		X	X	X	X			
CAS04-SD04-1209B					X		X		X			X			X		X	X	X	X			MS/MSD
CAA03-SD01-1209B					X		X		X			X			X		X	X	X	X			
CAA03-SD02-1209B					X		X		X			X			X		X	X	X	X			
CAA03-SD03-1209B					X		X		X			X			X		X	X	X	X			
CAA03-SD04-1209B					X		X		X			X			X		X	X	X	X			

[1] Labels containing D or P indicate a duplicate sample.

[2] As documented in the 1999 Project Plans for Sites 1, 4, 7, 11, and AOCs 1 and 2

MS/MSD- Matrix Spike/Matrix Spike Duplicate Sample

TABLE 2-2
Water Level Tables
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CTO-0190 Naval Weapons Station Yorktown Cheatham Annex, Williamsburg, Virginia

Sites 4, 9, and AOC 3: Temporary Monitoring Well Depth to Water Survey

11/04/09

WELL POINT	NORTHING	EASTING	ELEVATION	Depth to Water (bgs)
Site 4				
CAS04-GW01	3635154.98	12033257.80	21.34	8.69
CAS04-GW02	3635236.98	12033285.07	17.87	6.41
CAS04-GW03	3635329.67	12033202.39	20.00	8.24
CAS04-GW04	3635137.50	12033037.34	23.90	9.80
Site 9				
CAS09-GW01	3634329.31	12032033.79	27.14	8.40
CAS09-GW02	3634440.18	12032065.33	26.42	7.67
CAS09-GW03	3634350.94	12031960.75	26.61	8.28
CAS09-GW04	3634231.56	12031991.08	26.86	7.98
AOC 3				
CAA03-GW01	3635374.71	12032956.08	25.37	11.32
CAA03-GW02	3635434.63	12033220.23	17.63	6.12
CAA03-GW03	3635497.05	12033319.78	12.90	3.04
CAA03-GW04	3635460.33	12033318.87	11.63	1.85
CAA03-GW05	3635414.46	12033252.18	15.36	5.49

TABLE 2-3
Groundwater Quality Parameter Readings
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Location ID	CAA03-GW01	CAA03-GW02	CAA03-GW03	CAA03-GW04	CAA03-GW05	CAS04-GW01	CAS04-GW02	CAS04-GW03	CAS04-GW04	CAS09-GW01	CAS09-GW02	CAS09-GW03	CAS09-GW04
Sample Date	11/2/2009	11/5/2009	11/5/2009	11/5/2009	11/5/2009	10/30/2009	10/30/2009	10/30/2009	10/30/2009	11/2/2009	11/4/2009	11/4/2009	11/3/2009
Field Parameter[1]													
Dissolved Oxygen (mg/L)	2.91	0	NA	0	0	1.89	1.81	0	1.59	1.81	0	1.95	1.68
Dissolved Oxygen by Titration (mg/L)	1.5	0.4	1	0.8	1	1	1	1	0.7	2	1	1	1
Depth to water (ft)	NA	NA	NA	NA	NA	14.5	10	9.6	12.9	10.1	NA	NA	8.84
Oxidation Reduction Potential (MV)	-71	-156	NA	-185	-150	-255	-178	-242	-217	-180	-176	57	-32
Gallons (gal)	1.3	NA	NA	1.2	2.3	2	2.5	3	2.5	4	2.5	2.5	2
PH (ph)	6.8	6.83	NA	6.76	6.75	7.18	7.15	7.45	7.04	7.15	7.22	7.19	6.92
Salinity (PCT)	0	0	NA	0	0	0	0	0	0	0	0	0	0
Specific Conductivity (ms/cm)	0.77	0.85	NA	0.83	0.74	0.73	0.82	0.4	0.97	0.65	0.79	0.65	0.99
Temperature (Deg C)	19.48	17.3	NA	16.58	17.43	17.6	17.59	17.6	18.67	20.27	20.33	19.69	19
Turbidity (NTU)	55.3	179	NA	7.3	35.8	6.8	315	12	0	51	0	14.2	22.9

Notes

Deg C - Degrees Celsius
FT - Feet
Gal - Gallons
MG/L - Milligrams per liter
MS/CM - Milli-siemens per centimeter
MV - Millivolts
NTU - Nephlometeric turbidity units
PCT - Percent
PH - Standard pH units
1 Field parameters presented are the final parameter readings collected before groundwater sample collection.

TABLE 2-4
Surface Water Quality Parameter Readings
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Location ID	CAA03-SW01 (top of column)	CAA03-SW01 (middle of column)	CAA03-SW01 (bottom of column)	CAA03-SW02 (top of column)	CAA03-SW02 (middle of column)	CAA03-SW02 (bottom of column)	CAA03-SW03 (top of column)	CAA03-SW03 (middle of column)	CAA03-SW03 (bottom of column)	CAA03-SW04 (top of column)
Sample Date	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009
Field Parameter[1]										
Dissolved Oxygen (mg/L)	4.36	5.9	4.9	12.3	4.56	5.56	2.44	2.26	2.26	2.26
Oxidation Reduction Potential (MV)	32	13	34	58	14	28	182	156	168	59
PH (ph)	7.32	7.29	7.25	7.31	7.2	7.19	6.72	7.03	6.9	7.25
Salinity (PPT)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity (MS/CM)	0.36	0.37	0.36	0.33	0.33	0.33	0.32	0.31	0.32	0.33
Temperature (Deg C)	7.52	7.68	7.57	7.6	7.6	7.61	8.3	7.96	8	7.29
Turbidity (NTU)	3.4	8.1	11.5	3.8	15.4	32.1	3.3	4.1	4	2.5

Notes
Deg C - Degrees Celsius
MG/L - Milligrams per liter
MS/CM - Milli-siemens per centimeter
MV - Millivolts
NTU - Nephlometeric turbidity units
PPT - parts per trillion
PH - standard pH units
1 Field parameters presented were collected previous to
surface water sample collection
NA - Not Applicable; Salinity probe on the water quality meter not working while readings were being collected

TABLE 2-4
Surface Water Quality Parameter Readings
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Location ID	CAA03-SW04 (middle of column)	CAA03-SW04 (bottom of column)	CAS04-SW01 (top of column)	CAS04-SW01 (middle of column)	CAS04-SW01 (bottom of column)	CAS04-SW02 (top of column)	CAS04-SW02 (middle of column)	CAS04-SW02 (bottom of column)	CAS04-SW03 (top of column)	CAS04-SW03 (middle of column)
Sample Date	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/7/2009
Field Parameter[1]										
Dissolved Oxygen (mg/L)	2.26	2.26	2.65	3.33	4.13	5.48	5.92	6.6	8.46	9.2
Oxidation Reduction Potential (MV)	27	51	-30	-4	36	-6	-12	-15	-59	-59
PH (ph)	7.22	7.18	7.25	7.29	7.3	7.23	7.24	7.25	7.41	7.4
Salinity (PPT)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Specific Conductivity (MS/CM)	0.34	0.34	0.31	0.31	0.3	0.39	0.4	0.4	0.48	0.48
Temperature (Deg C)	7.33	7.42	7.06	7.1	7.34	7.67	7.68	7.65	7.71	7.66
Turbidity (NTU)	7.2	23.1	3.2	3	5.3	8	7	14	24.5	204

Notes
Deg C - Degrees Celsius
MG/L - Milligrams per liter
MS/CM - Milli-siemens per centimeter
MV - Millivolts
NTU - Nephlometeric turbidity units
PPT - parts per trillion
PH - standard pH units
1 Field parameters presented were collected previous to
surface water sample collection
NA - Not Applicable; Salinity probe on the water quality n

TABLE 2-4
Surface Water Quality Parameter Readings
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Location ID	CAS04-SW03 (bottom of column)	CAS04-SW04 (top of column)	CAS04-SW04 (middle of column)	CAS04-SW04 (bottom of column)	CAS04-SW05	CAS04-SW06	CAS04-SW07	CAS04-SW08	CAS04-SW09
Sample Date	12/7/2009	12/7/2009	12/7/2009	12/7/2009	12/8/2009	12/8/2009	12/8/2009	12/8/2009	12/8/2009
Field Parameter[1]									
Dissolved Oxygen (mg/L)	8.32	2.26	2.26	2.26	3.13	2.35	3.06	4.29	0
Oxidation Reduction Potential (MV)	-33	147	50	97	-11	-1	37	69	-114
PH (ph)	7.42	7.17	7.18	7.14	6.57	7.42	7.37	7.61	7.07
Salinity (PPT)	NA	NA	NA	NA	1	1	1	1	2
Specific Conductivity (MS/CM)	0.48	0.34	0.35	0.34	0.61	0.6	0.6	0.57	0.68
Temperature (Deg C)	9.63	7.61	7.42	7.45	10.13	10.71	12.59	14.82	12.48
Turbidity (NTU)	9.17	2.9	2.7	8.7	45.3	1.4	8.9	0.7	800

Notes

Deg C - Degrees Celsius
MG/L - Milligrams per liter
MS/CM - Milli-siemens per centimeter
MV - Millivolts
NTU - Nephlometeric turbidity units
PPT - parts per trillion
PH - standard pH units
1 Field parameters presented were collected previous to
surface water sample collection
NA - Not Applicable; Salinity probe on the water quality n

TABLE 2-5
Investigation Derived Waste Sample Summary
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Sample ID	Matrix	Full TCLP	Reactivity	Corrosivity	Ignitability
		SW846 1311/8260B, 8270C, 8081A, 8151A, 6010B, 7470A	SW846 9034, 9012	SW846 9045C	Pensky Martens
CAA03-IDW-110509	Aqueous IDW	X	X	X	X

TABLE 2-6
Data Qualification and Availability Summary Table
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

DV Qualifier	DV Qualification Code	Meaning of Code	Analyte Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
B	MBL	Method Blank Contamination; Not detected substantially above the level reported in associated laboratory blanks	391	1.94%		X		
B	EBL	Equipment Blank Contamination; Not detected substantially above the level reported in associated equipment blanks	51	0.25%		X		
B	FBL	Field Blank Contamination; Not detected substantially above the level reported in associated field blanks	104	0.52%		X		
CLEAR	CLEAR	Detected	1,952	9.69%	X			
J	2C	Second Column – Poor Dual Column Reproducibility	109	0.54%		X		
J	BRL	Detected; Below Reporting Limit	953	4.73%	X			
J	BSH	Detected, but Estimated; Blank Spike – Blank Spike/LCS – High Recovery	7	0.03%		X		
J	CCH	Detected, but Estimated; Continuing Calibration Verification – High Recovery	51	0.25%		X		
J	FD	Detected, but Estimated; Poor Field Duplicate Reproducibility	19	0.09%		X		
J	ICB	Detected, but Estimated; Detected, but Estimated; Initial Calibration – Poor Linearity or Curve Function	13	0.06%		X		
J	ISH	Detected, but Estimated; Internal Standard – High Recovery	5	0.02%		X		
J	ISL	Detected, but Estimated; Internal Standard – Low Recovery	2	0.01%		X		
J	LR	Detected, but Estimated; Concentration Exceeds Linear Range	11	0.055%		X		
J	MDP	Detected, but Estimated; Matrix Spike/Matrix Spike Duplicate (MS/MSD) Precision	74	0.37%		X		
J	SD	Detected, but Estimated; Poor Serial Dilution Reproducibility	131	0.65%		X		
J	SSL	Detected, but Estimated; Spiked Surrogate – Low Recovery	247	1.23%		X		
K	BSH	Detected, but Potentially Biased High; Blank Spike/LCS – High Recovery	16	0.079%		X		
K	MSH	Detected, but Potentially Biased High; MS and/or MSD – High Recovery	327	1.62%		X		
L	BSL	Detected, but Potentially Biased Low; Blank Spike/LCS – Low Recovery	27	0.13%		X		
L	MSL	Detected, but Potentially Biased Low; MS and/or MSD – Low Recovery	112	0.56%		X		
L	SSL	Detected, but Potentially Biased Low; Spiked Surrogate – Low Recovery	5	0.02%		X		
R	BSL	Rejected; Blank Spike/LCS – Low Recovery	84	0.42%			X	Completeness Accuracy
R	CC	Rejected; Continuing Calibration	1	0.00%			X	
R	ISL	Rejected; Internal Standard – Low Recovery	5	0.02%			X	Completeness Accuracy Precision
R	MSL	Rejected; MS and/or MSD – Low Recovery	20	0.10%			X	
U	CLEAR	Not detected	11,338	56.28%	X			
UJ	CCH	Not detected, QL may be inaccurate or imprecise; Continuing Calibration Verification – High Recovery	66	0.33%		X		
UJ	ICB	Not detected, QL may be inaccurate or imprecise; Initial Calibration – Poor Linearity or Curve Function	2	0.01%		X		

TABLE 2-6
Data Qualification and Availability Summary Table
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

DV Qualifier	DV Qualification Code	Meaning of Code	Analyte Count	Percent	Available as Reported	Available as Qualified	Not Available	Impact on PARCC
UJ	ISL	Not detected, QL may be inaccurate or imprecise; Internal Standard – Low Recovery	14	0.07%		X		
UJ	SSL	Not detected, QL may be inaccurate or imprecise; Spiked Surrogate – Low Recovery	3,734	18.53%		X		
UL	MSL	Not detected, QL may be Biased Low; Matrix Spike and/or Matrix Spike Duplicate – Low Recovery	63	0.31%		X		
UL	BSL	Not detected, QL may be Biased Low; Blank Spike/LCS – Low Recovery	144	0.71%		X		
UL	SSL	Not detected, QL may be Biased Low; Spiked Surrogate – Low Recovery	69	0.34%		X		
		TOTAL:	**20,147**	**100.00%**	**70.70%**	**28.76%**	**0.55%**	
					99.45% available for use, qualified as applicable (completeness goal of 95% available data met)		**Unavailable for use**	

"CLEAR" qualifiers indicate a detected result.

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
FMETAL	CAA03-GW02-1109	Aluminum	7429-90-5	14.6	UG_L	J	B	EBL
FMETAL	CAS04-GW01-1009	Selenium	7782-49-2	4.3	UG_L	J	B	EBL
FMETAL	CAA03-GW03-1109	Nickel	7440-02-0	1.2	UG_L	J	B	EBL
FMETAL	CAA03-GW04-1109	Nickel	7440-02-0	1.2	UG_L	J	B	EBL
FMETAL	CAA03-GW02-1109	Nickel	7440-02-0	0.69	UG_L	J	B	EBL
FMETAL	CAA03-GW05-1109	Zinc	7440-66-6	2.5	UG_L	J	B	EBL
FMETAL	CAA03-GW03-1109	Zinc	7440-66-6	2.8	UG_L	J	B	EBL
METAL	CAA03-SS10-1109	Cadmium	7440-43-9	0.02	MG_KG	J	B	EBL
SVOA	CAS04-SD07-1209A	Benzo(a)anthracene	56-55-3	7.3	UG_KG	J	B	EBL
SVOA	CAS04-SD07P-1209A	Benzo(a)anthracene	56-55-3	7.4	UG_KG	J	B	EBL
SVOA	CAS04-SD08-1209A	Benzo(a)anthracene	56-55-3	14	UG_KG	J	B	EBL
SVOA	CAS09-SD01-1209B	Benzo(b)fluoranthene	205-99-2	25	UG_KG	CLEAR	B	EBL
SVOA	CAS09-SD02-1209A	Benzo(b)fluoranthene	205-99-2	26	UG_KG	CLEAR	B	EBL
SVOA	CAS04-SD06-1209B	Benzo(b)fluoranthene	205-99-2	30	UG_KG	J	B	EBL
SVOA	CAS09-SD02-1209B	Benzo(b)fluoranthene	205-99-2	24	UG_KG	J	B	EBL
SVOA	CAS04-SD06-1209B	Benzo(a)anthracene	56-55-3	21	UG_KG	J	B	EBL
SVOA	CAS04-SD06-1209A	Benzo(b)fluoranthene	205-99-2	40	UG_KG	CLEAR	B	EBL
SVOA	CAS04-SD06-1209A	Benzo(a)anthracene	56-55-3	28	UG_KG	J	B	EBL
SVOA	CAS04-SD09-1209B	Benzo(b)fluoranthene	205-99-2	18	UG_KG	J	B	EBL
SVOA	CAS04-SD09-1209B	Benzo(a)anthracene	56-55-3	12	UG_KG	J	B	EBL
SVOA	CAS09-SD03-1209A	Benzo(a)anthracene	56-55-3	27	UG_KG	B	B	EBL
SVOA	CAS04-SD08-1209B	Benzo(a)anthracene	56-55-3	12	UG_KG	J	B	EBL
SVOA	CAS04-SW09-1209	Benzo(a)anthracene	56-55-3	0.16	UG_L	J	B	EBL
SVOA	CAS04-SW05-1209	Benzo(b)fluoranthene	205-99-2	0.20	UG_L	CLEAR	B	EBL
SVOA	CAS04-SW05-1209	Benzo(a)anthracene	56-55-3	0.17	UG_L	J	B	EBL
SVOA	CAS04-SW04-1209	Benzo(b)fluoranthene	205-99-2	0.58	UG_L	CLEAR	B	EBL
SVOA	CAS04-SW04-1209	Benzo(a)anthracene	56-55-3	0.34	UG_L	CLEAR	B	EBL
SVOA	CAS04-SW03-1209	Benzo(a)anthracene	56-55-3	0.19	UG_L	CLEAR	B	EBL
SVOA	CAS04-SD08-1209B	Benzo(b)fluoranthene	205-99-2	14	UG_KG	J	B	EBL
SVOA	CAA03-SD01-1209A	Benzo(a)anthracene	56-55-3	33	UG_KG	B	B	EBL
SVOA	CAA03-SW02-1209	Benzo(a)anthracene	56-55-3	0.14	UG_L	J	B	EBL
SVOA	CAS09-GW03-1109	Indeno(1,2,3-cd)pyrene	193-39-5	0.21	UG_L	CLEAR	B	EBL
SVOA	CAA03-GW02-1109	Indeno(1,2,3-cd)pyrene	193-39-5	0.24	UG_L	CLEAR	B	EBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
SVOA	CAA03-GW04-1109	Indeno(1,2,3-cd)pyrene	193-39-5	0.89	UG_L	CLEAR	B	EBL
SVOA	CAA03-GW03-1109	Indeno(1,2,3-cd)pyrene	193-39-5	0.29	UG_L	CLEAR	B	EBL
SVOA	CAS04-SD02-1209A	Benzo(a)anthracene	56-55-3	35	UG_KG	B	B	EBL
VOA	CAA03-SS08-1109	Acetone	67-64-1	110	UG_KG	CLEAR	B	EBL
VOA	CAA03-GW02-1109	Acetone	67-64-1	4	UG_L	J	B	EBL
VOA	CAA03-GW03-1109	Acetone	67-64-1	3	UG_L	J	B	EBL
VOA	CAA03-SS07-1109	Acetone	67-64-1	54	UG_KG	CLEAR	B	EBL
VOA	CAA03-SB10-1109	Acetone	67-64-1	100	UG_KG	CLEAR	B	EBL
VOA	CAA03-SB09-1109	Acetone	67-64-1	74	UG_KG	CLEAR	B	EBL
VOA	CAS09-SS01-1009	Acetone	67-64-1	66	UG_KG	B	B	EBL
VOA	CAA03-SB07-1109	Acetone	67-64-1	52	UG_KG	CLEAR	B	EBL
VOA	CAS04-GW02-1009	Carbon disulfide	75-15-0	2	UG_L	CLEAR	B	EBL
VOA	CAS04-GW04P-1009	Carbon disulfide	75-15-0	2	UG_L	CLEAR	B	EBL
VOA	CAS04-GW04-1009	Carbon disulfide	75-15-0	2	UG_L	CLEAR	B	EBL
VOA	CAS04-GW01-1009	Carbon disulfide	75-15-0	2	UG_L	CLEAR	B	EBL
VOA	CAS04-GW03-1009	Carbon disulfide	75-15-0	2	UG_L	CLEAR	B	EBL
VOA	CAA03-GW05-1109	Acetone	67-64-1	3	UG_L	J	B	EBL
VOA	CAA03-SS08P-1109	Acetone	67-64-1	100	UG_KG	CLEAR	B	EBL
FMETAL	CAS04-SW07-1209	Copper	7440-50-8	2.6	UG_L	CLEAR	B	FBL
FMETAL	CAA03-SW01P-1209	Copper	7440-50-8	2.4	UG_L	CLEAR	B	FBL
FMETAL	CAA03-SW01P-1209	Zinc	7440-66-6	8.4	UG_L	J	B	FBL
FMETAL	CAS04-SW03-1209	Copper	7440-50-8	1.9	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW03-1209	Zinc	7440-66-6	6.5	UG_L	J	B	FBL
FMETAL	CAS04-SW05-1209	Copper	7440-50-8	2.2	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW05-1209	Lead	7439-92-1	0.35	UG_L	J	B	FBL
FMETAL	CAS04-SW09-1209	Copper	7440-50-8	3.0	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW06-1209	Zinc	7440-66-6	11.9	UG_L	J	B	FBL
FMETAL	CAA03-SW01-1209	Zinc	7440-66-6	10.6	UG_L	J	B	FBL
FMETAL	CAS04-SW07-1209	Lead	7439-92-1	0.30	UG_L	J	B	FBL
FMETAL	CAS04-SW07-1209	Zinc	7440-66-6	14.8	UG_L	J	B	FBL
FMETAL	CAS04-SW07P-1209	Copper	7440-50-8	3.0	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW08-1209	Copper	7440-50-8	2.2	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW08-1209	Lead	7439-92-1	0.28	UG_L	J	B	FBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
FMETAL	CAS04-SW08-1209	Zinc	7440-66-6	12.8	UG_L	J	B	FBL
FMETAL	CAS04-SW06-1209	Copper	7440-50-8	1.6	UG_L	CLEAR	B	FBL
FMETAL	CAA03-SW04-1209	Zinc	7440-66-6	10.1	UG_L	J	B	FBL
FMETAL	CAA03-SW03-1209	Copper	7440-50-8	3.6	UG_L	CLEAR	B	FBL
FMETAL	CAA03-SW03-1209	Lead	7439-92-1	0.08	UG_L	J	B	FBL
FMETAL	CAA03-SW03-1209	Zinc	7440-66-6	9.0	UG_L	J	B	FBL
FMETAL	CAS04-SW04-1209	Copper	7440-50-8	3.2	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW04-1209	Lead	7439-92-1	0.66	UG_L	J	B	FBL
FMETAL	CAS04-SW04-1209	Zinc	7440-66-6	10	UG_L	J	B	FBL
FMETAL	CAA03-SW02-1209	Zinc	7440-66-6	7.8	UG_L	J	B	FBL
FMETAL	CAA03-SW04-1209	Lead	7439-92-1	0.24	UG_L	J	B	FBL
FMETAL	CAA03-SW02-1209	Copper	7440-50-8	3.0	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW01-1209	Copper	7440-50-8	4.3	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW01-1209	Zinc	7440-66-6	10.5	UG_L	J	B	FBL
FMETAL	CAS04-SW02-1209	Copper	7440-50-8	2.5	UG_L	CLEAR	B	FBL
FMETAL	CAS04-SW02-1209	Zinc	7440-66-6	7.5	UG_L	J	B	FBL
FMETAL	CAA03-SW01-1209	Copper	7440-50-8	4.2	UG_L	CLEAR	B	FBL
FMETAL	CAA03-SW01-1209	Lead	7439-92-1	0.50	UG_L	J	B	FBL
FMETAL	CAS04-SW07P-1209	Zinc	7440-66-6	16.0	UG_L	J	B	FBL
FMETAL	CAA03-SW04-1209	Copper	7440-50-8	3.5	UG_L	CLEAR	B	FBL
FMETAL	CAS04-GW03-1009	Aluminum	7429-90-5	64.4	UG_L	J	B	FBL
FMETAL	CAS04-GW04P-1009	Aluminum	7429-90-5	32.2	UG_L	J	B	FBL
FMETAL	CAS04-GW01-1009	Aluminum	7429-90-5	44.4	UG_L	J	B	FBL
FMETAL	CAS04-GW04-1009	Aluminum	7429-90-5	52.4	UG_L	J	B	FBL
METAL	CAA03-SW01-1209	Nickel	7440-02-0	1.1	UG_L	J	B	FBL
METAL	CAS04-GW04P-1009	Aluminum	7429-90-5	60.5	UG_L	J	B	FBL
METAL	CAS04-SW05-1209	Vanadium	7440-62-2	0.72	UG_L	J	B	FBL
METAL	CAS04-SW05-1209	Lead	7439-92-1	0.36	UG_L	J	B	FBL
METAL	CAS04-SW05-1209	Arsenic	7440-38-2	1.6	UG_L	J	B	FBL
METAL	CAS04-GW01-1009	Aluminum	7429-90-5	78.6	UG_L	J	B	FBL
METAL	CAA03-SW01P-1209	Nickel	7440-02-0	0.92	UG_L	J	B	FBL
METAL	CAS04-SW08-1209	Vanadium	7440-62-2	1.8	UG_L	J	B	FBL
METAL	CAA03-SW01P-1209	Arsenic	7440-38-2	3.3	UG_L	J	B	FBL

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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
METAL	CAA03-SW02-1209	Arsenic	7440-38-2	3.3	UG_L	J	B	FBL
METAL	CAA03-SW01-1209	Arsenic	7440-38-2	2.9	UG_L	J	B	FBL
METAL	CAS04-SW02-1209	Nickel	7440-02-0	1.1	UG_L	J	B	FBL
METAL	CAS04-SW02-1209	Arsenic	7440-38-2	1.7	UG_L	J	B	FBL
METAL	CAS04-SW01-1209	Nickel	7440-02-0	1.0	UG_L	J	B	FBL
METAL	CAS04-SW01-1209	Arsenic	7440-38-2	3.5	UG_L	J	B	FBL
METAL	CAA03-SW04-1209	Vanadium	7440-62-2	1.3	UG_L	J	B	FBL
METAL	CAA03-SW04-1209	Nickel	7440-02-0	1.3	UG_L	J	B	FBL
METAL	CAS04-SW04-1209	Vanadium	7440-62-2	1.7	UG_L	J	B	FBL
METAL	CAS04-SW04-1209	Nickel	7440-02-0	1.7	UG_L	J	B	FBL
METAL	CAA03-SW03-1209	Vanadium	7440-62-2	1.4	UG_L	J	B	FBL
METAL	CAA03-SW02-1209	Nickel	7440-02-0	0.73	UG_L	J	B	FBL
METAL	CAS04-GW04-1009	Aluminum	7429-90-5	50.9	UG_L	J	B	FBL
METAL	CAS04-SW07-1209	Vanadium	7440-62-2	1.3	UG_L	J	B	FBL
METAL	CAS04-SW09-1209	Vanadium	7440-62-2	2.1	UG_L	J	B	FBL
METAL	CAA03-SW03-1209	Nickel	7440-02-0	1.5	UG_L	J	B	FBL
METAL	CAS04-SW06-1209	Vanadium	7440-62-2	1.0	UG_L	J	B	FBL
PEST/PCB	CAA03-SB07-1109	Heptachlor	76-44-8	1.4	UG_KG	J	B	FBL
SVOA	CAS04-SD09-1209A	Fluorene	86-73-7	5.7	UG_KG	J	B	FBL
SVOA	CAS04-SD05-1209B	Fluorene	86-73-7	8.3	UG_KG	J	B	FBL
SVOA	CAA03-SW03-1209	Benzaldehyde	100-52-7	1	UG_L	J	B	FBL
SVOA	CAA03-SW02-1209	Fluorene	86-73-7	0.063	UG_L	J	B	FBL
SVOA	CAS04-SD03-1209A	Fluorene	86-73-7	14	UG_KG	J	B	FBL
SVOA	CAA03-SD03-1209A	Fluorene	86-73-7	6.1	UG_KG	J	B	FBL
SVOA	CAS04-SD04-1209A	Fluorene	86-73-7	12	UG_KG	J	B	FBL
VOA	CAA03-SB03-1109B	Acetone	67-64-1	73	UG_KG	CLEAR	B	FBL
VOA	CAA03-SS02-1109	Acetone	67-64-1	74	UG_KG	CLEAR	B	FBL
VOA	CAA03-SB03-1109A	Acetone	67-64-1	68	UG_KG	CLEAR	B	FBL
VOA	CAS04-SW09-1209	Acetone	67-64-1	4	UG_L	J	B	FBL
VOA	CAA03-SW04-1209	Acetone	67-64-1	3	UG_L	J	B	FBL
VOA	CAA03-SS06-1109	Acetone	67-64-1	43	UG_KG	CLEAR	B	FBL
VOA	CAA03-SS03-1109	Acetone	67-64-1	71	UG_KG	CLEAR	B	FBL
VOA	CAA03-SB05-1109A	Acetone	67-64-1	65	UG_KG	CLEAR	B	FBL

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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
VOA	CAA03-SB02-1109A	Acetone	67-64-1	29	UG_KG	CLEAR	B	FBL
VOA	CAA03-SS04-1109	Acetone	67-64-1	78	UG_KG	CLEAR	B	FBL
VOA	CAA03-SB04-1109A	Acetone	67-64-1	60	UG_KG	CLEAR	B	FBL
VOA	CAA03-SB06-1109	Acetone	67-64-1	45	UG_KG	CLEAR	B	FBL
VOA	CAS09-SS04-1109	Acetone	67-64-1	68	UG_KG	CLEAR	B	FBL
VOA	CAS04-SS03-1109	Acetone	67-64-1	78	UG_KG	CLEAR	B	FBL
VOA	CAS04-SB02-1109	Acetone	67-64-1	46	UG_KG	CLEAR	B	FBL
VOA	CAS04-SB01-1109	Acetone	67-64-1	74	UG_KG	CLEAR	B	FBL
VOA	CAS04-SS01-1109	Acetone	67-64-1	70	UG_KG	CLEAR	B	FBL
VOA	CAS09-SS02-1109	Acetone	67-64-1	82	UG_KG	B	B	FBL
VOA	CAA03-SB01-1109	Acetone	67-64-1	69	UG_KG	CLEAR	B	FBL
VOA	CAA03-SS01-1109	Acetone	67-64-1	82	UG_KG	CLEAR	B	FBL
VOA	CAS09-GW03P-1109	Acetone	67-64-1	5	UG_L	J	B	FBL
VOA	CAS04-GW04P-1009	Acetone	67-64-1	5	UG_L	J	B	FBL
VOA	CAS04-SB03-1109	Acetone	67-64-1	76	UG_KG	CLEAR	B	FBL
VOA	CAS04-GW02-1009	Acetone	67-64-1	3	UG_L	J	B	FBL
VOA	CAS09-GW01-1109	Acetone	67-64-1	3	UG_L	J	B	FBL
VOA	CAA03-GW01-1109	Acetone	67-64-1	3	UG_L	J	B	FBL
VOA	CAS09-SB04-1109	Acetone	67-64-1	68	UG_KG	CLEAR	B	FBL
VOA	CAS09-GW03-1109	Acetone	67-64-1	4	UG_L	J	B	FBL
VOA	CAS04-GW01-1009	Acetone	67-64-1	3	UG_L	J	B	FBL
VOA	CAA03-SW02-1209	Acetone	67-64-1	3	UG_L	J	B	FBL
VOA	CAS04-GW04-1009	Acetone	67-64-1	4	UG_L	J	B	FBL
AVSSEM	CAA03-SD03-1209A	Nickel	7440-02-0	0.0086	UMOL_G	J	B	MBL
AVSSEM	CAS04-SD03-1209B	Nickel	7440-02-0	0.011	UMOL_G	J	B	MBL
AVSSEM	CAA03-SD04-1209B	Nickel	7440-02-0	0.0053	UMOL_G	J	B	MBL
AVSSEM	CAA03-SD01-1209B	Zinc	7440-66-6	0.0147	UMOL_G	CLEAR	B	MBL
AVSSEM	CAA03-SD04-1209A	Nickel	7440-02-0	0.010	UMOL_G	J	B	MBL
AVSSEM	CAS04-SD04-1209B	Nickel	7440-02-0	0.0012	UMOL_G	J	B	MBL
AVSSEM	CAS04-SD04-1209A	Nickel	7440-02-0	0.0058	UMOL_G	J	B	MBL
AVSSEM	CAA03-SD01-1209B	Nickel	7440-02-0	0.0032	UMOL_G	J	B	MBL
AVSSEM	CAA03-SD03-1209B	Nickel	7440-02-0	0.0028	UMOL_G	J	B	MBL
AVSSEM	CAS04-SD01-1209B	Nickel	7440-02-0	0.0018	UMOL_G	J	B	MBL

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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
AVSSEM	CAS04-SD01-1209B	Zinc	7440-66-6	0.0095	UMOL_G	J	B	MBL
AVSSEM	CAA03-SD01-1209A	Nickel	7440-02-0	0.0045	UMOL_G	J	B	MBL
AVSSEM	CAS04-SD02-1209B	Nickel	7440-02-0	0.0030	UMOL_G	J	B	MBL
AVSSEM	CAS04-SD01-1209A	Nickel	7440-02-0	0.0029	UMOL_G	J	B	MBL
FMETAL	CAS09-GW03P-1109	Thallium	7440-28-0	0.44	UG_L	J	B	MBL
FMETAL	CAS09-GW03P-1109	Aluminum	7429-90-5	54.2	UG_L	J	B	MBL
FMETAL	CAS09-GW02-1109	Aluminum	7429-90-5	60.3	UG_L	J	B	MBL
FMETAL	CAS09-GW02-1109	Thallium	7440-28-0	0.24	UG_L	J	B	MBL
FMETAL	CAS04-SW01-1209	Lead	7439-92-1	0.25	UG_L	J	B	MBL
FMETAL	CAS04-SW01-1209	Chromium	7440-47-3	1.9	UG_L	J	B	MBL
FMETAL	CAS04-SW09-1209	Potassium	7440-09-7	1380	UG_L	CLEAR	B	MBL
FMETAL	CAS04-SW09-1209	Nickel	7440-02-0	0.98	UG_L	J	B	MBL
FMETAL	CAA03-SW01-1209	Vanadium	7440-62-2	0.92	UG_L	J	B	MBL
FMETAL	CAS04-SW09-1209	Chromium	7440-47-3	1.0	UG_L	J	B	MBL
FMETAL	CAS04-SW01-1209	Thallium	7440-28-0	0.21	UG_L	J	B	MBL
FMETAL	CAA03-SW01P-1209	Chromium	7440-47-3	1.8	UG_L	J	B	MBL
FMETAL	CAA03-SW01-1209	Chromium	7440-47-3	2.1	UG_L	J	B	MBL
FMETAL	CAS04-SW02-1209	Vanadium	7440-62-2	0.92	UG_L	J	B	MBL
FMETAL	CAS04-SW02-1209	Lead	7439-92-1	0.26	UG_L	J	B	MBL
FMETAL	CAS04-SW02-1209	Chromium	7440-47-3	1.6	UG_L	J	B	MBL
FMETAL	CAA03-SW02-1209	Chromium	7440-47-3	1.6	UG_L	J	B	MBL
FMETAL	CAA03-SW02-1209	Lead	7439-92-1	0.19	UG_L	J	B	MBL
FMETAL	CAS04-SW01-1209	Vanadium	7440-62-2	0.86	UG_L	J	B	MBL
FMETAL	CAA03-SW02-1209	Thallium	7440-28-0	0.16	UG_L	J	B	MBL
FMETAL	CAS09-GW03-1109	Aluminum	7429-90-5	53.4	UG_L	J	B	MBL
FMETAL	CAS04-GW04-1009	Thallium	7440-28-0	0.58	UG_L	J	B	MBL
FMETAL	CAS04-GW02-1009	Thallium	7440-28-0	0.13	UG_L	J	B	MBL
FMETAL	CAS04-GW04P-1009	Thallium	7440-28-0	0.20	UG_L	J	B	MBL
FMETAL	CAA03-SW01P-1209	Lead	7439-92-1	0.22	UG_L	J	B	MBL
FMETAL	CAS04-SW06-1209	Nickel	7440-02-0	0.89	UG_L	J	B	MBL
FMETAL	CAS09-GW01-1109	Thallium	7440-28-0	0.13	UG_L	J	B	MBL
FMETAL	CAA03-GW01-1109	Aluminum	7429-90-5	76.9	UG_L	J	B	MBL
FMETAL	CAA03-GW01-1109	Thallium	7440-28-0	0.11	UG_L	J	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
FMETAL	CAS09-GW04-1109	Aluminum	7429-90-5	55.9	UG_L	J	B	MBL
FMETAL	CAS09-GW04-1109	Thallium	7440-28-0	0.25	UG_L	J	B	MBL
FMETAL	CAS04-GW03-1009	Iron	7439-89-6	38.8	UG_L	J	B	MBL
FMETAL	CAS04-SW07-1209	Chromium	7440-47-3	1.3	UG_L	J	B	MBL
FMETAL	CAS04-SW05-1209	Iron	7439-89-6	8.7	UG_L	J	B	MBL
FMETAL	CAS04-SW05-1209	Nickel	7440-02-0	0.54	UG_L	J	B	MBL
FMETAL	CAS04-SW04-1209	Chromium	7440-47-3	0.72	UG_L	J	B	MBL
FMETAL	CAS04-SW09-1209	Lead	7439-92-1	0.22	UG_L	J	B	MBL
FMETAL	CAS04-SW05-1209	Zinc	7440-66-6	5.2	UG_L	J	B	MBL
FMETAL	CAA03-SW03-1209	Thallium	7440-28-0	0.23	UG_L	J	B	MBL
FMETAL	CAA03-SW03-1209	Chromium	7440-47-3	0.74	UG_L	J	B	MBL
FMETAL	CAS04-SW05-1209	Chromium	7440-47-3	1.4	UG_L	J	B	MBL
FMETAL	CAS04-SW07-1209	Iron	7439-89-6	13.3	UG_L	J	B	MBL
FMETAL	CAS04-SW05-1209	Potassium	7440-09-7	1320	UG_L	CLEAR	B	MBL
FMETAL	CAA03-GW03-1109	Thallium	7440-28-0	0.62	UG_L	J	B	MBL
FMETAL	CAS04-SW06-1209	Chromium	7440-47-3	1.1	UG_L	J	B	MBL
FMETAL	CAA03-GW04-1109	Thallium	7440-28-0	0.91	UG_L	J	B	MBL
FMETAL	CAS04-SW06-1209	Iron	7439-89-6	5.2	UG_L	J	B	MBL
FMETAL	CAA03-GW02-1109	Thallium	7440-28-0	0.44	UG_L	J	B	MBL
FMETAL	CAS04-SW06-1209	Lead	7439-92-1	0.15	UG_L	J	B	MBL
FMETAL	CAA03-GW05-1109	Thallium	7440-28-0	0.23	UG_L	J	B	MBL
FMETAL	CAA03-SW03-1209	Arsenic	7440-38-2	2.2	UG_L	J	B	MBL
FMETAL	CAS04-SW08-1209	Nickel	7440-02-0	0.95	UG_L	J	B	MBL
FMETAL	CAS04-SW05-1209	Thallium	7440-28-0	0.11	UG_L	J	B	MBL
FMETAL	CAS04-SW08-1209	Chromium	7440-47-3	1.4	UG_L	J	B	MBL
FMETAL	CAS04-SW07-1209	Nickel	7440-02-0	1.2	UG_L	J	B	MBL
FMETAL	CAS04-SW03-1209	Chromium	7440-47-3	1.5	UG_L	J	B	MBL
FMETAL	CAS04-SW03-1209	Lead	7439-92-1	0.32	UG_L	J	B	MBL
FMETAL	CAA03-SW04-1209	Chromium	7440-47-3	0.56	UG_L	J	B	MBL
FMETAL	CAA03-SW01P-1209	Vanadium	7440-62-2	0.91	UG_L	J	B	MBL
FMETAL	CAS04-SW08-1209	Iron	7439-89-6	7.9	UG_L	J	B	MBL
FMETAL	CAS04-SW07P-1209	Lead	7439-92-1	0.27	UG_L	J	B	MBL
FMETAL	CAS04-SW04-1209	Thallium	7440-28-0	0.11	UG_L	J	B	MBL

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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
FMETAL	CAS04-SW07P-1209	Chromium	7440-47-3	1.5	UG_L	J	B	MBL
FMETAL	CAS04-SW07P-1209	Nickel	7440-02-0	0.95	UG_L	J	B	MBL
METAL	CAS04-SD05-1209A	Silver	7440-22-4	0.18	MG_KG	J	B	MBL
METAL	CAS04-SW09-1209	Chromium	7440-47-3	1.9	UG_L	J	B	MBL
METAL	CAS04-SD07-1209A	Antimony	7440-36-0	0.29	MG_KG	J	B	MBL
METAL	CAS04-SD05-1209B	Sodium	7440-23-5	48.0	MG_KG	J	B	MBL
METAL	CAS04-SD07-1209A	Sodium	7440-23-5	29.2	MG_KG	J	B	MBL
METAL	CAS04-SD07-1209B	Antimony	7440-36-0	0.81	MG_KG	J	B	MBL
METAL	CAS04-SW09-1209	Potassium	7440-09-7	1440	UG_L	CLEAR	B	MBL
METAL	CAS04-SW08-1209	Nickel	7440-02-0	1.5	UG_L	J	B	MBL
METAL	CAS04-SW07-1209	Nickel	7440-02-0	1.4	UG_L	J	B	MBL
METAL	CAS04-SD05-1209B	Silver	7440-22-4	0.14	MG_KG	J	B	MBL
METAL	CAS04-SD09-1209A	Antimony	7440-36-0	0.44	MG_KG	J	B	MBL
METAL	CAS04-SW08-1209	Chromium	7440-47-3	1.9	UG_L	J	B	MBL
METAL	CAS04-SD06-1209B	Sodium	7440-23-5	33.2	MG_KG	J	B	MBL
METAL	CAS04-SD06-1209A	Sodium	7440-23-5	106	MG_KG	CLEAR	B	MBL
METAL	CAS04-SD09-1209B	Sodium	7440-23-5	26.3	MG_KG	J	B	MBL
METAL	CAS04-SW09-1209	Nickel	7440-02-0	0.60	UG_L	J	B	MBL
METAL	CAS04-SD09-1209B	Silver	7440-22-4	0.08	MG_KG	J	B	MBL
METAL	CAS04-SW07P-1209	Chromium	7440-47-3	4.1	UG_L	CLEAR	B	MBL
METAL	CAS04-SD09-1209A	Sodium	7440-23-5	29.9	MG_KG	J	B	MBL
METAL	CAS04-SD09-1209B	Antimony	7440-36-0	0.20	MG_KG	J	B	MBL
METAL	CAS04-SD05-1209A	Sodium	7440-23-5	48.1	MG_KG	J	B	MBL
METAL	CAA03-SD04-1209B	Selenium	7782-49-2	0.25	MG_KG	J	B	MBL
METAL	CAS09-SD02-1209A	Silver	7440-22-4	0.15	MG_KG	J	B	MBL
METAL	CAS04-SD01P-1209A	Sodium	7440-23-5	22.3	MG_KG	J	B	MBL
METAL	CAS04-SD01P-1209A	Selenium	7782-49-2	0.36	MG_KG	J	B	MBL
METAL	CAS04-SD01-1209B	Sodium	7440-23-5	100	MG_KG	CLEAR	B	MBL
METAL	CAS04-SD01-1209B	Selenium	7782-49-2	0.59	MG_KG	J	B	MBL
METAL	CAS04-SD01-1209A	Sodium	7440-23-5	23.4	MG_KG	J	B	MBL
METAL	CAS04-SD01-1209A	Selenium	7782-49-2	0.44	MG_KG	J	B	MBL
METAL	CAA03-SD03-1209B	Sodium	7440-23-5	47.9	MG_KG	J	B	MBL
METAL	CAA03-SD03-1209B	Selenium	7782-49-2	1.1	MG_KG	J	B	MBL

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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
METAL	CAA03-SD03-1209A	Sodium	7440-23-5	27.0	MG_KG	J	B	MBL
METAL	CAS04-SD01P-1209B	Sodium	7440-23-5	63.4	MG_KG	J	B	MBL
METAL	CAA03-SD04-1209B	Sodium	7440-23-5	30.7	MG_KG	J	B	MBL
METAL	CAS04-SD02-1209A	Selenium	7782-49-2	0.67	MG_KG	J	B	MBL
METAL	CAA03-SD04-1209A	Sodium	7440-23-5	24.2	MG_KG	J	B	MBL
METAL	CAA03-SD04-1209A	Selenium	7782-49-2	0.24	MG_KG	J	B	MBL
METAL	CAS04-SD04-1209B	Sodium	7440-23-5	27.2	MG_KG	J	B	MBL
METAL	CAS04-SD04-1209A	Sodium	7440-23-5	40.9	MG_KG	J	B	MBL
METAL	CAS04-SD04-1209A	Selenium	7782-49-2	0.31	MG_KG	J	B	MBL
METAL	CAS09-SD02-1209B	Sodium	7440-23-5	51.0	MG_KG	J	B	MBL
METAL	CAS09-SD03-1209A	Antimony	7440-36-0	0.52	MG_KG	J	B	MBL
METAL	CAS09-SD03-1209A	Sodium	7440-23-5	45.2	MG_KG	J	B	MBL
METAL	CAS09-SD03-1209B	Sodium	7440-23-5	48.3	MG_KG	J	B	MBL
METAL	CAA03-SD02-1209B	Antimony	7440-36-0	0.76	MG_KG	CLEAR	B	MBL
METAL	CAA03-SD02-1209B	Sodium	7440-23-5	62.7	MG_KG	J	B	MBL
METAL	CAA03-SD03-1209A	Selenium	7782-49-2	0.36	MG_KG	J	B	MBL
METAL	CAS09-SD02-1209A	Sodium	7440-23-5	27.9	MG_KG	J	B	MBL
METAL	CAS04-SD07P-1209A	Silver	7440-22-4	0.08	MG_KG	J	B	MBL
METAL	CAS04-SD07P-1209A	Sodium	7440-23-5	26.8	MG_KG	J	B	MBL
METAL	CAS04-SD07P-1209B	Antimony	7440-36-0	0.66	MG_KG	J	B	MBL
METAL	CAS04-SD07P-1209B	Sodium	7440-23-5	30.6	MG_KG	J	B	MBL
METAL	CAS04-SD08-1209A	Antimony	7440-36-0	0.34	MG_KG	J	B	MBL
METAL	CAS04-SD08-1209B	Antimony	7440-36-0	0.44	MG_KG	J	B	MBL
METAL	CAS09-SD01-1209A	Antimony	7440-36-0	0.47	MG_KG	J	B	MBL
METAL	CAS09-SD01-1209A	Silver	7440-22-4	0.08	MG_KG	J	B	MBL
METAL	CAS09-SD01-1209A	Sodium	7440-23-5	42.0	MG_KG	J	B	MBL
METAL	CAA03-SW03-1209	Arsenic	7440-38-2	5.7	UG_L	CLEAR	B	MBL
METAL	CAS04-SD01P-1209B	Selenium	7782-49-2	0.38	MG_KG	J	B	MBL
METAL	CAS09-SD01-1209B	Sodium	7440-23-5	15.7	MG_KG	J	B	MBL
METAL	CAS04-SD07-1209B	Sodium	7440-23-5	75.5	MG_KG	J	B	MBL
METAL	CAS09-SB02-1109	Thallium	7440-28-0	0.16	MG_KG	J	B	MBL
METAL	CAS04-SD03-1209B	Sodium	7440-23-5	162	MG_KG	CLEAR	B	MBL
METAL	CAS04-SD03-1209A	Sodium	7440-23-5	186	MG_KG	CLEAR	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
METAL	CAS04-SD03-1209A	Selenium	7782-49-2	0.57	MG_KG	J	B	MBL
METAL	CAA03-SD01-1209B	Sodium	7440-23-5	152	MG_KG	CLEAR	B	MBL
METAL	CAA03-SD01-1209B	Selenium	7782-49-2	0.39	MG_KG	J	B	MBL
METAL	CAA03-SD01-1209A	Sodium	7440-23-5	65.7	MG_KG	J	B	MBL
METAL	CAA03-SD01-1209A	Selenium	7782-49-2	0.43	MG_KG	J	B	MBL
METAL	CAS04-SD02-1209B	Sodium	7440-23-5	27.2	MG_KG	J	B	MBL
METAL	CAS04-SD02-1209B	Selenium	7782-49-2	0.35	MG_KG	J	B	MBL
METAL	CAS04-SD02-1209A	Sodium	7440-23-5	57.9	MG_KG	J	B	MBL
METAL	CAS09-SD01-1209B	Antimony	7440-36-0	0.34	MG_KG	J	B	MBL
METAL	CAS04-SB05-1109	Thallium	7440-28-0	0.16	MG_KG	J	B	MBL
METAL	CAS09-GW04-1109	Thallium	7440-28-0	0.62	UG_L	J	B	MBL
METAL	CAA03-SS03-1109	Thallium	7440-28-0	0.12	MG_KG	J	B	MBL
METAL	CAA03-SB04-1109B	Thallium	7440-28-0	0.16	MG_KG	J	B	MBL
METAL	CAA03-SB04-1109A	Thallium	7440-28-0	0.13	MG_KG	J	B	MBL
METAL	CAA03-SS04-1109	Thallium	7440-28-0	0.13	MG_KG	J	B	MBL
METAL	CAA03-SB02-1109B	Thallium	7440-28-0	0.26	MG_KG	J	B	MBL
METAL	CAA03-SB02-1109A	Thallium	7440-28-0	0.18	MG_KG	CLEAR	B	MBL
METAL	CAA03-SS02-1109	Thallium	7440-28-0	0.17	MG_KG	J	B	MBL
METAL	CAA03-SB05-1109B	Thallium	7440-28-0	0.04	MG_KG	J	B	MBL
METAL	CAA03-SB05-1109B	Copper	7440-50-8	2.2	MG_KG	J	B	MBL
METAL	CAA03-SB03-1109B	Thallium	7440-28-0	0.11	MG_KG	J	B	MBL
METAL	CAA03-SS05-1109	Thallium	7440-28-0	0.1	MG_KG	J	B	MBL
METAL	CAA03-SS06-1109	Thallium	7440-28-0	0.13	MG_KG	J	B	MBL
METAL	CAS04-SS05-1109	Thallium	7440-28-0	0.20	MG_KG	CLEAR	B	MBL
METAL	CAS04-SB04-1109	Thallium	7440-28-0	0.08	MG_KG	J	B	MBL
METAL	CAS04-SB04-1109	Copper	7440-50-8	2.0	MG_KG	J	B	MBL
METAL	CAS04-SS04-1109	Thallium	7440-28-0	0.08	MG_KG	J	B	MBL
METAL	CAS04-SB03-1109	Thallium	7440-28-0	0.23	MG_KG	CLEAR	B	MBL
METAL	CAS04-SW01-1209	Thallium	7440-28-0	0.13	UG_L	J	B	MBL
METAL	CAS04-SW01-1209	Vanadium	7440-62-2	2.0	UG_L	J	B	MBL
METAL	CAS09-GW02-1109	Thallium	7440-28-0	0.31	UG_L	J	B	MBL
METAL	CAS09-GW03P-1109	Thallium	7440-28-0	0.69	UG_L	J	B	MBL
METAL	CAS09-SB01-1009	Thallium	7440-28-0	0.20	MG_KG	J	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
METAL	CAA03-SB05-1109A	Thallium	7440-28-0	0.11	MG_KG	J	B	MBL
METAL	CAA03-SS10-1109	Thallium	7440-28-0	0.07	MG_KG	J	B	MBL
METAL	CAA03-GW05-1109	Thallium	7440-28-0	0.36	UG_L	J	B	MBL
METAL	CAA03-GW02-1109	Thallium	7440-28-0	0.81	UG_L	J	B	MBL
METAL	CAA03-GW04-1109	Thallium	7440-28-0	0.45	UG_L	J	B	MBL
METAL	CAA03-GW03-1109	Thallium	7440-28-0	1.1	UG_L	J	B	MBL
METAL	CAA03-SW03-1209	Chromium	7440-47-3	1.6	UG_L	J	B	MBL
METAL	CAA03-SW03-1209	Thallium	7440-28-0	0.35	UG_L	J	B	MBL
METAL	CAS04-SW04-1209	Arsenic	7440-38-2	3.8	UG_L	J	B	MBL
METAL	CAS04-SW04-1209	Chromium	7440-47-3	2.0	UG_L	J	B	MBL
METAL	CAS04-SW04-1209	Thallium	7440-28-0	0.15	UG_L	J	B	MBL
METAL	CAA03-SB07-1109	Thallium	7440-28-0	0.12	MG_KG	J	B	MBL
METAL	CAA03-SB03-1109A	Thallium	7440-28-0	0.13	MG_KG	J	B	MBL
METAL	CAA03-SB10-1109	Thallium	7440-28-0	0.06	MG_KG	J	B	MBL
METAL	CAA03-GW01-1109	Thallium	7440-28-0	0.20	UG_L	J	B	MBL
METAL	CAA03-SB09-1109	Thallium	7440-28-0	0.22	MG_KG	J	B	MBL
METAL	CAA03-SS09-1109	Thallium	7440-28-0	0.09	MG_KG	J	B	MBL
METAL	CAA03-SB08P-1109	Thallium	7440-28-0	0.20	MG_KG	CLEAR	B	MBL
METAL	CAA03-SB08-1109	Thallium	7440-28-0	0.20	MG_KG	J	B	MBL
METAL	CAA03-SS08P-1109	Thallium	7440-28-0	0.13	MG_KG	J	B	MBL
METAL	CAA03-SS08-1109	Thallium	7440-28-0	0.14	MG_KG	J	B	MBL
METAL	CAA03-SB06-1109	Thallium	7440-28-0	0.11	MG_KG	J	B	MBL
METAL	CAA03-SW04-1209	Arsenic	7440-38-2	4.4	UG_L	J	B	MBL
METAL	CAA03-SW04-1209	Chromium	7440-47-3	1.5	UG_L	J	B	MBL
METAL	CAS04-SW01-1209	Chromium	7440-47-3	3.3	UG_L	CLEAR	B	MBL
METAL	CAA03-SS07-1109	Thallium	7440-28-0	0.19	MG_KG	CLEAR	B	MBL
METAL	CAS09-SS02-1109	Thallium	7440-28-0	0.12	MG_KG	J	B	MBL
METAL	CAS04-SS01-1109	Thallium	7440-28-0	0.09	MG_KG	J	B	MBL
METAL	CAS09-GW03-1109	Thallium	7440-28-0	0.13	UG_L	J	B	MBL
METAL	CAA03-SS01-1109	Thallium	7440-28-0	0.13	MG_KG	J	B	MBL
METAL	CAS09-SB04-1109	Thallium	7440-28-0	0.11	MG_KG	J	B	MBL
METAL	CAS09-SS04-1109	Thallium	7440-28-0	0.17	MG_KG	CLEAR	B	MBL
METAL	CAS09-SB05P-1109	Thallium	7440-28-0	0.16	MG_KG	J	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
METAL	CAS09-SB05-1109	Thallium	7440-28-0	0.17	MG_KG	J	B	MBL
METAL	CAS09-SS05P-1109	Thallium	7440-28-0	0.16	MG_KG	J	B	MBL
METAL	CAS09-SS05-1109	Thallium	7440-28-0	0.17	MG_KG	CLEAR	B	MBL
METAL	CAS04-SW07-1209	Chromium	7440-47-3	2.0	UG_L	J	B	MBL
METAL	CAS09-SS03-1109	Thallium	7440-28-0	0.06	MG_KG	J	B	MBL
METAL	CAS04-SS02-1109	Thallium	7440-28-0	0.21	MG_KG	J	B	MBL
METAL	CAS09-SS01-1009	Thallium	7440-28-0	0.07	MG_KG	J	B	MBL
METAL	CAS04-SW03-1209	Chromium	7440-47-3	6.3	UG_L	CLEAR	B	MBL
METAL	CAS04-SW05-1209	Chromium	7440-47-3	1.5	UG_L	J	B	MBL
METAL	CAS04-SW05-1209	Nickel	7440-02-0	0.65	UG_L	J	B	MBL
METAL	CAS04-SW05-1209	Potassium	7440-09-7	1380	UG_L	CLEAR	B	MBL
METAL	CAS04-SW05-1209	Thallium	7440-28-0	0.19	UG_L	J	B	MBL
METAL	CAS04-SW05-1209	Zinc	7440-66-6	3.2	UG_L	J	B	MBL
METAL	CAS04-SW06-1209	Chromium	7440-47-3	1.5	UG_L	J	B	MBL
METAL	CAS04-SW06-1209	Lead	7439-92-1	0.18	UG_L	J	B	MBL
METAL	CAS04-SW06-1209	Nickel	7440-02-0	1.1	UG_L	J	B	MBL
METAL	CAS09-SB03-1109	Thallium	7440-28-0	0.09	MG_KG	J	B	MBL
METAL	CAS04-SW02-1209	Vanadium	7440-62-2	1.4	UG_L	J	B	MBL
METAL	CAS04-GW02-1009	Thallium	7440-28-0	0.32	UG_L	J	B	MBL
METAL	CAS04-GW02-1009	Copper	7440-50-8	1.4	UG_L	J	B	MBL
METAL	CAS04-GW04P-1009	Thallium	7440-28-0	0.35	UG_L	J	B	MBL
METAL	CAS04-GW04P-1009	Iron	7439-89-6	10.5	UG_L	J	B	MBL
METAL	CAS04-GW04P-1009	Copper	7440-50-8	1.5	UG_L	J	B	MBL
METAL	CAS04-GW04-1009	Iron	7439-89-6	9.7	UG_L	J	B	MBL
METAL	CAS04-GW03-1009	Thallium	7440-28-0	0.11	UG_L	J	B	MBL
METAL	CAS04-SS03-1109	Thallium	7440-28-0	0.08	MG_KG	J	B	MBL
METAL	CAS04-SW02-1209	Aluminum	7429-90-5	108	UG_L	J	B	MBL
METAL	CAA03-SB01-1109	Thallium	7440-28-0	0.11	MG_KG	J	B	MBL
METAL	CAS09-GW01-1109	Thallium	7440-28-0	0.19	UG_L	J	B	MBL
METAL	CAS04-SB02-1109	Thallium	7440-28-0	0.07	MG_KG	J	B	MBL
METAL	CAS04-SW02-1209	Chromium	7440-47-3	2.0	UG_L	J	B	MBL
METAL	CAA03-SW01-1209	Chromium	7440-47-3	1.9	UG_L	J	B	MBL
METAL	CAA03-SW01-1209	Lead	7439-92-1	0.32	UG_L	J	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
Sites 4, 9, and AOC 3 Site Inspection
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
METAL	CAA03-SW01-1209	Vanadium	7440-62-2	1.7	UG_L	J	B	MBL
METAL	CAA03-SW02-1209	Aluminum	7429-90-5	26.7	UG_L	J	B	MBL
METAL	CAA03-SW02-1209	Chromium	7440-47-3	1.8	UG_L	J	B	MBL
METAL	CAA03-SW02-1209	Lead	7439-92-1	0.28	UG_L	J	B	MBL
METAL	CAA03-SW02-1209	Vanadium	7440-62-2	1.0	UG_L	J	B	MBL
METAL	CAA03-SW01P-1209	Aluminum	7429-90-5	44.3	UG_L	J	B	MBL
METAL	CAA03-SW01P-1209	Chromium	7440-47-3	1.7	UG_L	J	B	MBL
METAL	CAA03-SW01P-1209	Lead	7439-92-1	0.26	UG_L	J	B	MBL
METAL	CAA03-SW01P-1209	Vanadium	7440-62-2	0.90	UG_L	J	B	MBL
PEST/PCB	CAS09-SD02-1209A	4,4'-DDE	72-55-9	2.7	UG_KG	JJB	B	MBL
PEST/PCB	CAS04-SD01P-1209B	4,4'-DDE	72-55-9	0.73	UG_KG	JB	B	MBL
PEST/PCB	CAS09-SD03-1209B	4,4'-DDE	72-55-9	2.9	UG_KG	JJB	B	MBL
PEST/PCB	CAA03-SS01-1109	4,4'-DDE	72-55-9	0.96	UG_KG	J	B	MBL
PEST/PCB	CAS04-SS01-1109	4,4'-DDE	72-55-9	0.67	UG_KG	J	B	MBL
PEST/PCB	CAS04-SD01P-1209B	4,4'-DDD	72-54-8	0.97	UG_KG	JB	B	MBL
PEST/PCB	CAS04-SD02-1209B	4,4'-DDE	72-55-9	0.97	UG_KG	JB	B	MBL
PEST/PCB	CAA03-SD01-1209A	4,4'-DDE	72-55-9	1.0	UG_KG	JB	B	MBL
PEST/PCB	CAA03-SD01-1209A	4,4'-DDD	72-54-8	3.6	UG_KG	JPB	B	MBL
PEST/PCB	CAS04-SD04-1209B	4,4'-DDT	50-29-3	2.5	UG_KG	JPB	B	MBL
PEST/PCB	CAA03-SD04-1209B	4,4'-DDD	72-54-8	1.3	UG_KG	JB	B	MBL
PEST/PCB	CAA03-SD04-1209B	4,4'-DDT	50-29-3	0.89	UG_KG	JB	B	MBL
PEST/PCB	CAA03-SD03-1209A	4,4'-DDE	72-55-9	2.1	UG_KG	BJ	B	MBL
PEST/PCB	CAA03-SD03-1209A	Dieldrin	60-57-1	2.4	UG_KG	BJ	B	MBL
PEST/PCB	CAS04-SD01-1209A	4,4'-DDT	50-29-3	2.7	UG_KG	JB	B	MBL
PEST/PCB	CAA03-SS01-1109	4,4'-DDT	50-29-3	1.0	UG_KG	J	B	MBL
PEST/PCB	CAA03-SD01-1209B	4,4'-DDE	72-55-9	1.0	UG_KG	JB	B	MBL
PEST/PCB	CAS09-SS04-1109	4,4'-DDE	72-55-9	1.6	UG_KG	J	B	MBL
PEST/PCB	CAS09-SB05-1109	4,4'-DDE	72-55-9	1.2	UG_KG	J	B	MBL
PEST/PCB	CAS09-SS05P-1109	4,4'-DDE	72-55-9	1.5	UG_KG	J	B	MBL
PEST/PCB	CAS09-SS05-1109	4,4'-DDT	50-29-3	0.90	UG_KG	J	B	MBL
PEST/PCB	CAS09-SB03-1109	4,4'-DDT	50-29-3	0.92	UG_KG	J	B	MBL
PEST/PCB	CAS09-SB03-1109	4,4'-DDE	72-55-9	0.55	UG_KG	J	B	MBL
PEST/PCB	CAS09-SS03-1109	4,4'-DDE	72-55-9	2.1	UG_KG	J	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
PEST/PCB	CAS09-SB02-1109	4,4'-DDE	72-55-9	1.3	UG_KG	J	B	MBL
PEST/PCB	CAS09-SB04-1109	4,4'-DDT	50-29-3	1.1	UG_KG	J	B	MBL
PEST/PCB	CAS09-SS01-1009	4,4'-DDE	72-55-9	0.65	UG_KG	J	B	MBL
PEST/PCB	CAS04-SD01-1209A	4,4'-DDD	72-54-8	2.6	UG_KG	JB	B	MBL
PEST/PCB	CAA03-SB01-1109	4,4'-DDE	72-55-9	1.6	UG_KG	J	B	MBL
PEST/PCB	CAA03-SD03-1209B	4,4'-DDT	50-29-3	2.1	UG_KG	JPB	B	MBL
PEST/PCB	CAA03-SD03-1209B	4,4'-DDD	72-54-8	2.0	UG_KG	JPB	B	MBL
PEST/PCB	CAA03-SD03-1209B	4,4'-DDE	72-55-9	1.3	UG_KG	JB	B	MBL
PEST/PCB	CAS04-SS01-1109	4,4'-DDT	50-29-3	1.3	UG_KG	J	B	MBL
PEST/PCB	CAS04-SS03-1109	4,4'-DDE	72-55-9	0.72	UG_KG	J	B	MBL
PEST/PCB	CAS04-SS03-1109	4,4'-DDT	50-29-3	2.2	UG_KG	J	B	MBL
PEST/PCB	CAA03-SD04-1209B	4,4'-DDE	72-55-9	1.3	UG_KG	JB	B	MBL
PEST/PCB	CAS04-SD01-1209A	4,4'-DDE	72-55-9	1.9	UG_KG	JPB	B	MBL
SVOA	CAA03-SD01-1209B	Indeno(1,2,3-cd)pyrene	193-39-5	31	UG_KG	B	B	MBL
SVOA	CAA03-SD03-1209A	Dibenz(a,h)anthracene	53-70-3	27	UG_KG	JB	B	MBL
SVOA	CAA03-SD04-1209A	Benzo(a)pyrene	50-32-8	13	UG_KG	JB	B	MBL
SVOA	CAA03-SD04-1209A	Benzo(k)fluoranthene	207-08-9	8.5	UG_KG	JB	B	MBL
SVOA	CAA03-SD04-1209A	Benzo(b)fluoranthene	205-99-2	31	UG_KG	B	B	MBL
SVOA	CAA03-SD04-1209A	Benzo(a)anthracene	56-55-3	16	UG_KG	JB	B	MBL
SVOA	CAS04-SD03-1209B	Carbazole	86-74-8	7.6	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209B	Carbazole	86-74-8	4.8	UG_KG	JB	B	MBL
SVOA	CAA03-SS10-1109	Indeno(1,2,3-cd)pyrene	193-39-5	20	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209B	Dibenz(a,h)anthracene	53-70-3	6.4	UG_KG	JB	B	MBL
SVOA	CAA03-SS08-1109	Benzo(g,h,i)perylene	191-24-2	3.8	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209B	Benzo(k)fluoranthene	207-08-9	18	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209B	Benzo(b)fluoranthene	205-99-2	46	UG_KG	B	B	MBL
SVOA	CAA03-SD01-1209B	Benzo(a)anthracene	56-55-3	28	UG_KG	B	B	MBL
SVOA	CAA03-SS10-1109	Benzo(g,h,i)perylene	191-24-2	2.6	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209B	Benzo(g,h,i)perylene	191-24-2	9.8	UG_KG	JB	B	MBL
SVOA	CAA03-SB03-1109A	Fluoranthene	206-44-0	8.4	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209A	Dibenz(a,h)anthracene	53-70-3	6.8	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209A	Benzo(g,h,i)perylene	191-24-2	8.3	UG_KG	JB	B	MBL
SVOA	CAS09-SB04-1109	Acenaphthylene	208-96-8	1.6	UG_KG	JB	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
SVOA	CAS09-SB04-1109	Anthracene	120-12-7	2.5	UG_KG	JB	B	MBL
SVOA	CAS09-SB04-1109	Fluoranthene	206-44-0	4.9	UG_KG	JB	B	MBL
SVOA	CAS09-SB04-1109	Benzo(a)anthracene	56-55-3	11	UG_KG	JB	B	MBL
SVOA	CAA03-SB08-1109	Indeno(1,2,3-cd)pyrene	193-39-5	5.6	UG_KG	JB	B	MBL
SVOA	CAA03-SB03-1109A	Phenanthrene	85-01-8	2.5	UG_KG	JB	B	MBL
SVOA	CAA03-SS09-1109	Indeno(1,2,3-cd)pyrene	193-39-5	18	UG_KG	JB	B	MBL
SVOA	CAA03-SB05-1109A	Phenanthrene	85-01-8	3.4	UG_KG	JB	B	MBL
SVOA	CAA03-SB05-1109A	Fluoranthene	206-44-0	7.4	UG_KG	JB	B	MBL
SVOA	CAA03-SS08-1109	Indeno(1,2,3-cd)pyrene	193-39-5	25	UG_KG	JB	B	MBL
SVOA	CAA03-SS08P-1109	Benzo(g,h,i)perylene	191-24-2	2.6	UG_KG	JB	B	MBL
SVOA	CAA03-SB08P-1109	Indeno(1,2,3-cd)pyrene	193-39-5	21	UG_KG	JB	B	MBL
SVOA	CAA03-SB08P-1109	Benzo(g,h,i)perylene	191-24-2	3.0	UG_KG	JB	B	MBL
SVOA	CAS09-SB04-1109	Carbazole	86-74-8	3.7	UG_KG	JB	B	MBL
SVOA	CAA03-GW04-1109	Chrysene	218-01-9	0.58	UG_L	B	B	MBL
SVOA	CAS04-SD01-1209A	Carbazole	86-74-8	5.0	UG_KG	JB	B	MBL
SVOA	CAS04-SD01-1209A	Indeno(1,2,3-cd)pyrene	193-39-5	9.9	UG_KG	JB	B	MBL
SVOA	CAS04-SD01-1209A	Benzo(a)pyrene	50-32-8	17	UG_KG	JB	B	MBL
SVOA	CAS04-SD01-1209A	Benzo(k)fluoranthene	207-08-9	12	UG_KG	JB	B	MBL
SVOA	CAS04-SD01-1209A	Benzo(b)fluoranthene	205-99-2	34	UG_KG	B	B	MBL
SVOA	CAS04-SD01-1209A	Benzo(a)anthracene	56-55-3	19	UG_KG	JB	B	MBL
SVOA	CAA03-SD03-1209B	Carbazole	86-74-8	2.7	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209A	Indeno(1,2,3-cd)pyrene	193-39-5	19	UG_KG	JB	B	MBL
SVOA	CAA03-SD03-1209B	Benzo(a)pyrene	50-32-8	16	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209A	Carbazole	86-74-8	6.7	UG_KG	JB	B	MBL
SVOA	CAS04-SD01P-1209A	Benzo(a)anthracene	56-55-3	9.0	UG_KG	JB	B	MBL
SVOA	CAA03-SD03-1209B	Benzo(a)anthracene	56-55-3	15	UG_KG	JB	B	MBL
SVOA	CAA03-SD03-1209B	Indeno(1,2,3-cd)pyrene	193-39-5	9.1	UG_KG	JB	B	MBL
SVOA	CAS09-SD01-1209B	Benzo(a)anthracene	56-55-3	16	UG_KG	JB	B	MBL
SVOA	CAS09-SD01-1209B	Carbazole	86-74-8	5.5	UG_KG	JB	B	MBL
SVOA	CAS09-SD02-1209A	Benzo(a)anthracene	56-55-3	17	UG_KG	JB	B	MBL
SVOA	CAS09-SD02-1209A	Carbazole	86-74-8	6.3	UG_KG	JB	B	MBL
SVOA	CAS09-SD02-1209B	Benzo(a)anthracene	56-55-3	15	UG_KG	JB	B	MBL
SVOA	CAS09-SD02-1209B	Carbazole	86-74-8	6.4	UG_KG	JB	B	MBL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
SVOA	CAS09-SD03-1209A	Carbazole	86-74-8	6.8	UG_KG	JB	B	MBL
SVOA	CAS09-SD03-1209B	Benzo(a)anthracene	56-55-3	8.4	UG_KG	JB	B	MBL
SVOA	CAS09-SD03-1209B	Carbazole	86-74-8	6.2	UG_KG	JB	B	MBL
SVOA	CAA03-SD02-1209B	Carbazole	86-74-8	12	UG_KG	JB	B	MBL
SVOA	CAA03-SD03-1209B	Benzo(b)fluoranthene	205-99-2	32	UG_KG	B	B	MBL
SVOA	CAS04-SD01P-1209A	Indeno(1,2,3-cd)pyrene	193-39-5	4.9	UG_KG	JB	B	MBL
SVOA	CAA03-SD03-1209B	Benzo(k)fluoranthene	207-08-9	12	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209A	Benzo(g,h,i)perylene	191-24-2	7.1	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209A	Carbazole	86-74-8	8.6	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209B	Benzo(a)anthracene	56-55-3	12	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209B	Benzo(b)fluoranthene	205-99-2	26	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209B	Benzo(k)fluoranthene	207-08-9	9.9	UG_KG	JB	B	MBL
SVOA	CAS04-SD01P-1209B	Benzo(a)anthracene	56-55-3	2.7	UG_KG	JB	B	MBL
SVOA	CAS04-SD01P-1209A	Benzo(a)pyrene	50-32-8	9.0	UG_KG	JB	B	MBL
SVOA	CAS04-SD01P-1209A	Benzo(k)fluoranthene	207-08-9	6.3	UG_KG	JB	B	MBL
SVOA	CAA03-SD01-1209A	Benzo(k)fluoranthene	207-08-9	19	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209B	Benzo(a)pyrene	50-32-8	12	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209B	Indeno(1,2,3-cd)pyrene	193-39-5	7.1	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209B	Carbazole	86-74-8	2.4	UG_KG	JB	B	MBL
SVOA	CAS04-SD01P-1209A	Benzo(b)fluoranthene	205-99-2	16	UG_KG	JB	B	MBL
SVOA	CAS04-SD02-1209A	Indeno(1,2,3-cd)pyrene	193-39-5	23	UG_KG	JB	B	MBL
VOA	CAS04-SD08-1209B	Acetone	67-64-1	8	UG_KG	JB	B	MBL
VOA	CAS09-GW03-1109	Carbon disulfide	75-15-0	0.6	UG_L	JB	B	MBL
VOA	CAS09-GW03P-1109	Carbon disulfide	75-15-0	0.4	UG_L	JB	B	MBL
VOA	CAS09-GW02-1109	Carbon disulfide	75-15-0	0.4	UG_L	JB	B	MBL
VOA	CAS04-SD08-1209A	Acetone	67-64-1	42	UG_KG	B	B	MBL
VOA	CAS04-SD07-1209A	Acetone	67-64-1	24	UG_KG	JB	B	MBL
VOA	CAA03-SS04-1109	Toluene	108-88-3	4	UG_KG	JB	B	MBL
VOA	CAA03-GW01-1109	Carbon disulfide	75-15-0	0.7	UG_L	JB	B	MBL
VOA	CAS04-SD07-1209B	Acetone	67-64-1	22	UG_KG	JB	B	MBL
VOA	CAS04-SD07P-1209B	Acetone	67-64-1	19	UG_KG	JB	B	MBL
VOA	CAS09-SD03-1209A	Acetone	67-64-1	85	UG_KG	B	B	MBL
VOA	CAS04-SD03-1209B	Acetone	67-64-1	11	UG_KG	JB	B	MBL

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Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
VOA	CAS04-SD03-1209A	Acetone	67-64-1	13	UG_KG	JB	B	MBL
VOA	CAA03-SD01-1209B	Acetone	67-64-1	12	UG_KG	JB	B	MBL
VOA	CAS04-SD02-1209B	Acetone	67-64-1	21	UG_KG	JB	B	MBL
VOA	CAS04-SD02-1209A	Acetone	67-64-1	34	UG_KG	JB	B	MBL
VOA	CAS04-SD01P-1209B	Acetone	67-64-1	27	UG_KG	JB	B	MBL
VOA	CAS04-SD01P-1209A	Acetone	67-64-1	33	UG_KG	B	B	MBL
VOA	CAS09-SS03-1109	Acetone	67-64-1	52	UG_KG	B	B	MBL
VOA	CAS09-SD03-1209B	Acetone	67-64-1	14	UG_KG	JB	B	MBL
VOA	CAS09-GW01-1109	Carbon disulfide	75-15-0	0.7	UG_L	JB	B	MBL
VOA	CAS09-SD02-1209B	Acetone	67-64-1	8	UG_KG	JB	B	MBL
VOA	CAS09-SD02-1209A	Acetone	67-64-1	12	UG_KG	JB	B	MBL
VOA	CAS09-SD01-1209B	Acetone	67-64-1	7	UG_KG	JB	B	MBL
VOA	CAS09-SD01-1209A	Acetone	67-64-1	11	UG_KG	JB	B	MBL
VOA	CAS04-SD07P-1209A	Acetone	67-64-1	34	UG_KG	B	B	MBL
VOA	CAS04-SD04-1209B	Acetone	67-64-1	64	UG_KG	B	B	MBL
VOA	CAS09-SB02-1109	Acetone	67-64-1	44	UG_KG	B	B	MBL
VOA	CAS09-SB03-1109	Acetone	67-64-1	40	UG_KG	B	B	MBL
VOA	CAA03-SD03-1209B	Acetone	67-64-1	60	UG_KG	B	B	MBL
SVOA	CAS09-SS01-1009	Caprolactam	105-60-2	450	UG_KG	U	R	BSL
SVOA	CAS04-GW03-1009	1,2,4,5-Tetrachlorobenzene	95-94-3	9	UG_L	U	R	BSL
SVOA	CAS04-SD02-1209A	Caprolactam	105-60-2	740	UG_KG	U	R	BSL
SVOA	CAS04-SD02-1209B	Caprolactam	105-60-2	620	UG_KG	U	R	BSL
SVOA	CAA03-SD01-1209A	Caprolactam	105-60-2	640	UG_KG	U	R	BSL
SVOA	CAA03-SD01-1209B	Caprolactam	105-60-2	600	UG_KG	U	R	BSL
SVOA	CAS04-SD03-1209A	Caprolactam	105-60-2	650	UG_KG	U	R	BSL
SVOA	CAS04-SD03-1209B	Caprolactam	105-60-2	540	UG_KG	U	R	BSL
SVOA	CAA03-SD04-1209A	Caprolactam	105-60-2	590	UG_KG	U	R	BSL
SVOA	CAS04-SD01P-1209A	Caprolactam	105-60-2	540	UG_KG	U	R	BSL
SVOA	CAA03-SD03-1209A	Caprolactam	105-60-2	640	UG_KG	U	R	BSL
SVOA	CAS04-SD01-1209B	Caprolactam	105-60-2	500	UG_KG	U	R	BSL
SVOA	CAS09-SB01-1009	Caprolactam	105-60-2	500	UG_KG	U	R	BSL
SVOA	CAS09-SS02-1109	Caprolactam	105-60-2	440	UG_KG	U	R	BSL
SVOA	CAS09-SB02-1109	Caprolactam	105-60-2	470	UG_KG	U	R	BSL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
SVOA	CAS09-SS03-1109	Caprolactam	105-60-2	460	UG_KG	U	R	BSL
SVOA	CAS09-SB03-1109	Caprolactam	105-60-2	410	UG_KG	U	R	BSL
SVOA	CAS09-SS05-1109	Caprolactam	105-60-2	490	UG_KG	U	R	BSL
SVOA	CAS09-SS05P-1109	Caprolactam	105-60-2	470	UG_KG	U	R	BSL
SVOA	CAS04-SD09-1209A	Caprolactam	105-60-2	700	UG_KG	U	R	BSL
SVOA	CAA03-SD04-1209B	Caprolactam	105-60-2	540	UG_KG	U	R	BSL
SVOA	CAS04-SD07P-1209A	Caprolactam	105-60-2	600	UG_KG	U	R	BSL
SVOA	CAS04-SD07P-1209B	Caprolactam	105-60-2	560	UG_KG	U	R	BSL
SVOA	CAS04-SD08-1209A	Caprolactam	105-60-2	580	UG_KG	U	R	BSL
SVOA	CAS04-SD08-1209B	Caprolactam	105-60-2	530	UG_KG	U	R	BSL
SVOA	CAS04-SD09-1209B	Caprolactam	105-60-2	590	UG_KG	U	R	BSL
SVOA	CAS04-SD06-1209A	Caprolactam	105-60-2	630	UG_KG	U	R	BSL
SVOA	CAS04-SD06-1209B	Caprolactam	105-60-2	660	UG_KG	U	R	BSL
SVOA	CAS04-SD05-1209A	Caprolactam	105-60-2	790	UG_KG	U	R	BSL
SVOA	CAS04-SD05-1209B	Caprolactam	105-60-2	670	UG_KG	U	R	BSL
SVOA	CAS04-SD01P-1209B	Caprolactam	105-60-2	520	UG_KG	U	R	BSL
SVOA	CAS04-SD07-1209B	Caprolactam	105-60-2	560	UG_KG	U	R	BSL
SVOA	CAS04-GW01-1009	1,2,4,5-Tetrachlorobenzene	95-94-3	10	UG_L	U	R	BSL
SVOA	CAS09-SD01-1209A	Caprolactam	105-60-2	570	UG_KG	U	R	BSL
SVOA	CAS09-SD01-1209B	Caprolactam	105-60-2	480	UG_KG	U	R	BSL
SVOA	CAS09-SD03-1209A	Caprolactam	105-60-2	570	UG_KG	U	R	BSL
SVOA	CAS09-SD03-1209B	Caprolactam	105-60-2	570	UG_KG	U	R	BSL
SVOA	CAA03-SD02-1209A	Caprolactam	105-60-2	1900	UG_KG	U	R	BSL
SVOA	CAA03-SD02-1209B	Caprolactam	105-60-2	680	UG_KG	U	R	BSL
SVOA	CAA03-SD03-1209B	Caprolactam	105-60-2	520	UG_KG	U	R	BSL
SVOA	CAS04-SD01-1209A	Caprolactam	105-60-2	550	UG_KG	U	R	BSL
SVOA	CAS04-SD07-1209A	Caprolactam	105-60-2	560	UG_KG	U	R	BSL
SVOA	CAA03-SB08-1109	Benzo(g,h,i)perylene	191-24-2	23	UG_KG	U	R	BSL
SVOA	CAS09-SB05-1109	Caprolactam	105-60-2	480	UG_KG	U	R	BSL
SVOA	CAA03-SB02-1109A	Caprolactam	105-60-2	490	UG_KG	U	R	BSL
SVOA	CAA03-SB02-1109B	Caprolactam	105-60-2	720	UG_KG	U	R	BSL
SVOA	CAA03-SS04-1109	Caprolactam	105-60-2	510	UG_KG	U	R	BSL
SVOA	CAA03-SB04-1109A	Caprolactam	105-60-2	470	UG_KG	U	R	BSL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
SVOA	CAA03-SB04-1109B	Caprolactam	105-60-2	670	UG_KG	U	R	BSL
SVOA	CAA03-SS08-1109	Caprolactam	105-60-2	560	UG_KG	U	R	BSL
SVOA	CAA03-SB07-1109	Caprolactam	105-60-2	480	UG_KG	U	R	BSL
SVOA	CAA03-SB05-1109B	Caprolactam	105-60-2	620	UG_KG	U	R	BSL
SVOA	CAA03-SB08-1109	Caprolactam	105-60-2	510	UG_KG	U	R	BSL
SVOA	CAA03-SB05-1109A	Caprolactam	105-60-2	470	UG_KG	U	R	BSL
SVOA	CAA03-SB08P-1109	Caprolactam	105-60-2	480	UG_KG	U	R	BSL
SVOA	CAA03-SS09-1109	Caprolactam	105-60-2	470	UG_KG	U	R	BSL
SVOA	CAA03-SS09-1109	Benzo(g,h,i)perylene	191-24-2	21	UG_KG	U	R	BSL
SVOA	CAA03-SB09-1109	Caprolactam	105-60-2	480	UG_KG	U	R	BSL
SVOA	CAA03-SB09-1109	Benzo(g,h,i)perylene	191-24-2	22	UG_KG	U	R	BSL
SVOA	CAA03-SS10-1109	Caprolactam	105-60-2	460	UG_KG	U	R	BSL
SVOA	CAA03-SB10-1109	Caprolactam	105-60-2	390	UG_KG	U	R	BSL
SVOA	CAA03-SB10-1109	Benzo(g,h,i)perylene	191-24-2	18	UG_KG	U	R	BSL
SVOA	CAA03-SS08P-1109	Caprolactam	105-60-2	550	UG_KG	U	R	BSL
SVOA	CAS04-SB04-1109	Caprolactam	105-60-2	470	UG_KG	U	R	BSL
SVOA	CAS04-GW04-1009	1,2,4,5-Tetrachlorobenzene	95-94-3	10	UG_L	U	R	BSL
SVOA	CAS04-GW04P-1009	1,2,4,5-Tetrachlorobenzene	95-94-3	10	UG_L	U	R	BSL
SVOA	CAS04-GW02-1009	2,4,6-Trichlorophenol	88-06-2	10	UG_L	U	R	BSL
SVOA	CAS04-GW02-1009	2,4-Dinitrophenol	51-28-5	24	UG_L	U	R	BSL
SVOA	CAS04-GW02-1009	4-Nitrophenol	100-02-7	24	UG_L	U	R	BSL
SVOA	CAS04-GW02-1009	4,6-Dinitro-2-methylphenol	534-52-1	24	UG_L	U	R	BSL
SVOA	CAS04-GW02-1009	1,2,4,5-Tetrachlorobenzene	95-94-3	10	UG_L	U	R	BSL
SVOA	CAS09-GW04-1109	Benzaldehyde	100-52-7	10	UG_L	U	R	BSL
SVOA	CAA03-SS02-1109	Caprolactam	105-60-2	530	UG_KG	U	R	BSL
SVOA	CAS04-SS04-1109	Caprolactam	105-60-2	480	UG_KG	U	R	BSL
SVOA	CAA03-SS07-1109	Caprolactam	105-60-2	460	UG_KG	U	R	BSL
SVOA	CAS04-SS05-1109	Caprolactam	105-60-2	500	UG_KG	U	R	BSL
SVOA	CAS04-SB05-1109	Caprolactam	105-60-2	510	UG_KG	U	R	BSL
SVOA	CAA03-SS05-1109	Caprolactam	105-60-2	460	UG_KG	U	R	BSL
SVOA	CAA03-SS03-1109	Caprolactam	105-60-2	520	UG_KG	U	R	BSL
SVOA	CAA03-SB03-1109A	Caprolactam	105-60-2	480	UG_KG	U	R	BSL
SVOA	CAA03-SB03-1109B	Caprolactam	105-60-2	500	UG_KG	U	R	BSL

TABLE 2-7
Data Summary Table: R- and B-Qualified Data
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Analysis Group	Sample ID	Analyte Name	CAS Number	Analytical Value	Units	Lab Qualifier	DV Qualifier	DV Qualification Code
SVOA	CAA03-SS06-1109	Caprolactam	105-60-2	530	UG_KG	U	R	BSL
SVOA	CAA03-SB06-1109	Caprolactam	105-60-2	490	UG_KG	U	R	BSL
SVOA	CAS04-SB03-1109	Caprolactam	105-60-2	520	UG_KG	U	R	BSL
VOA	CAS09-SS02-1109	1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	76-13-1	5	UG_KG	U	R	CC
VOA	CAS04-SD04-1209B	1,2,4-Trichlorobenzene	120-82-1	6	UG_KG	U	R	ISL
VOA	CAS04-SD04-1209B	1,2-Dibromo-3-chloropropane	96-12-8	6	UG_KG	U	R	ISL
VOA	CAS04-SD04-1209B	1,3-Dichlorobenzene	541-73-1	6	UG_KG	U	R	ISL
VOA	CAS04-SD04-1209B	1,1,2,2-Tetrachloroethane	79-34-5	6	UG_KG	U	R	ISL
VOA	CAS04-SD04-1209B	Isopropylbenzene	98-82-8	6	UG_KG	U	R	ISL
AVSSEM	CAS04-SD02-1209A	Mercury	7439-97-6	0.000088	UMOL_G	U	R	MSL
AVSSEM	CAS04-SD04-1209A	Mercury	7439-97-6	0.000066	UMOL_G	U	R	MSL
AVSSEM	CAS04-SD04-1209B	Mercury	7439-97-6	0.000061	UMOL_G	U	R	MSL
AVSSEM	CAA03-SD04-1209A	Mercury	7439-97-6	0.000071	UMOL_G	U	R	MSL
AVSSEM	CAA03-SD04-1209B	Mercury	7439-97-6	0.000062	UMOL_G	U	R	MSL
AVSSEM	CAA03-SD03-1209A	Mercury	7439-97-6	0.000075	UMOL_G	U	R	MSL
AVSSEM	CAS04-SD01-1209B	Mercury	7439-97-6	0.000063	UMOL_G	U	R	MSL
AVSSEM	CAS04-SD02-1209B	Mercury	7439-97-6	0.000071	UMOL_G	U	R	MSL
AVSSEM	CAA03-SD01-1209A	Mercury	7439-97-6	0.000076	UMOL_G	U	R	MSL
AVSSEM	CAA03-SD03-1209B	Mercury	7439-97-6	0.000063	UMOL_G	U	R	MSL
SVOA	CAS09-SS04-1109	Caprolactam	105-60-2	480	UG_KG	U	R	MSL
SVOA	CAS04-SD04-1209A	4-Chloroaniline	106-47-8	460	UG_KG	U	R	MSL
SVOA	CAS09-SD02-1209A	Caprolactam	105-60-2	510	UG_KG	U	R	MSL
SVOA	CAS04-SD04-1209A	Caprolactam	105-60-2	560	UG_KG	U	R	MSL
SVOA	CAS04-SD04-1209B	Caprolactam	105-60-2	500	UG_KG	U	R	MSL
SVOA	CAS04-SD04-1209B	3,3'-Dichlorobenzidine	91-94-1	400	UG_KG	U	R	MSL
SVOA	CAS09-SB04-1109	Caprolactam	105-60-2	460	UG_KG	U	R	MSL
SVOA	CAS09-SD02-1209B	Caprolactam	105-60-2	540	UG_KG	U	R	MSL
SVOA	CAS09-SD02-1209A	2,4-Dinitrophenol	51-28-5	1300	UG_KG	U	R	MSL
VOA	CAS04-SD04-1209A	Methyl acetate	79-20-9	10	UG_KG	U	R	MSL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 2-1 - SITE 4 TEST PIT LOCATIONS (2009).MXD CBOWMAN 8/17/2010 09:45:07

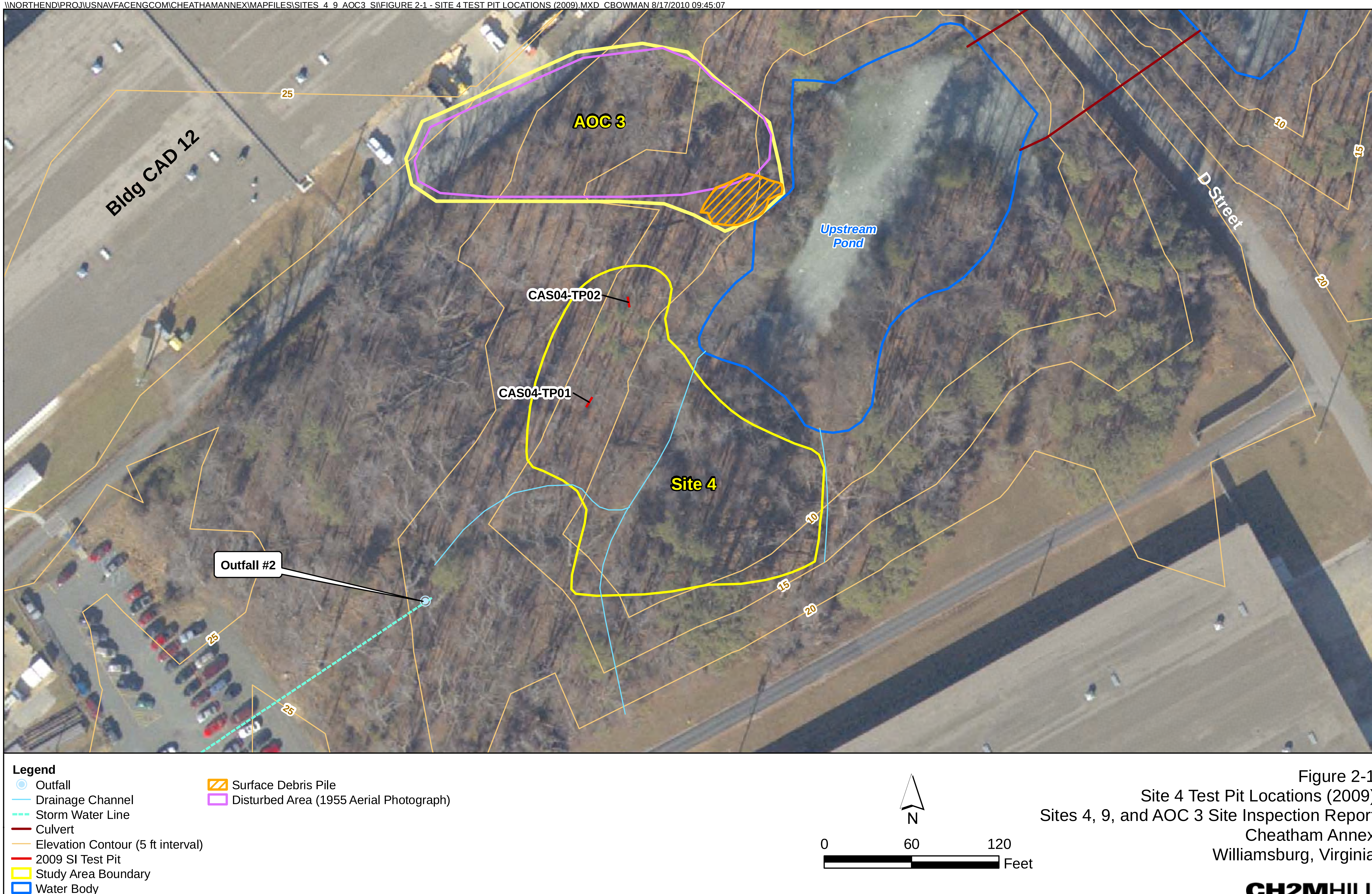

Figure 2-1
Site 4 Test Pit Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 2-2 - SITE 4 SOIL AND GROUNDWATER SAMPLE LOCATIONS (2009).MXD CBOWMAN 8/17/2010 09:46:40

Legend

- Trench Soil Sample Location
- DPT Soil Sample Location
- Well Point
- Outfall
- Study Area Boundary
- Water Body
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)

N

0 75 150 Feet

Figure 2-2
Site 4 Soil and Groundwater Sample Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 2-3 - SITE 4 SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS (2009).MXD CBOWMAN 8/17/2010 09:47:54

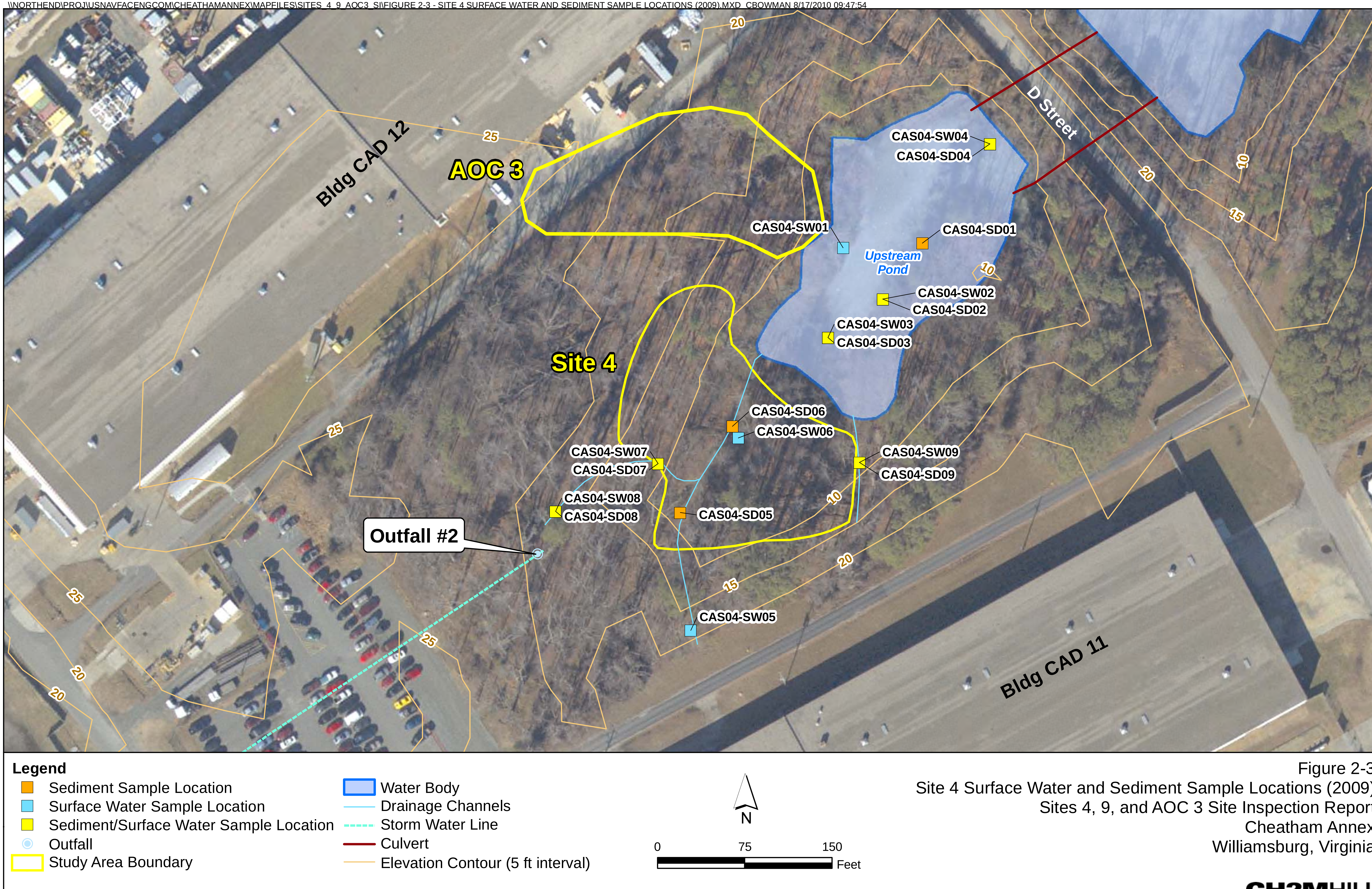


Figure 2-3
Site 4 Surface Water and Sediment Sample Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 2-4 - SITE 9 SOIL AND GROUNDWATER SAMPLE LOCATIONS (2009).MXD CBOWMAN 8/17/2010 09:49:34

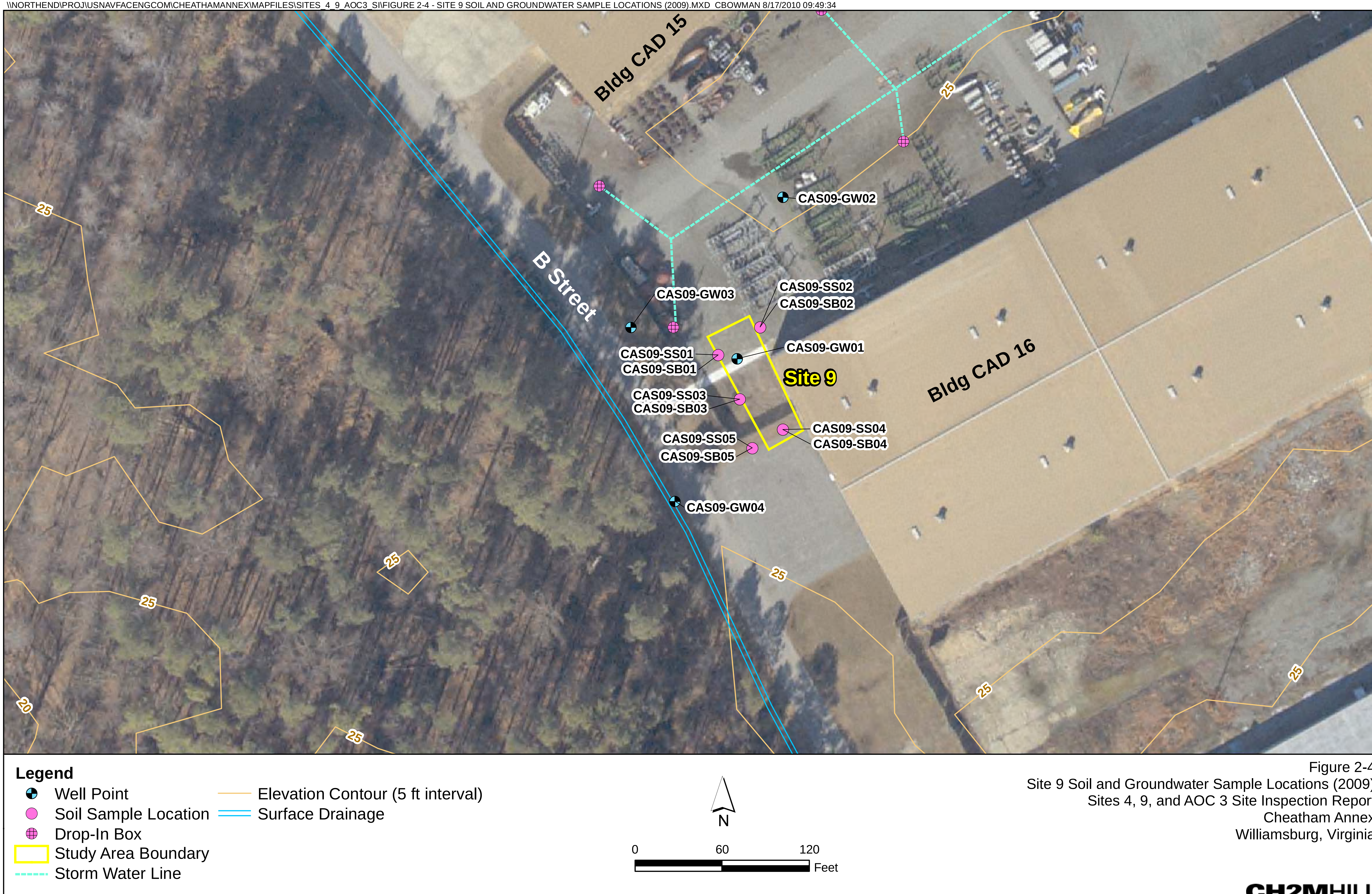
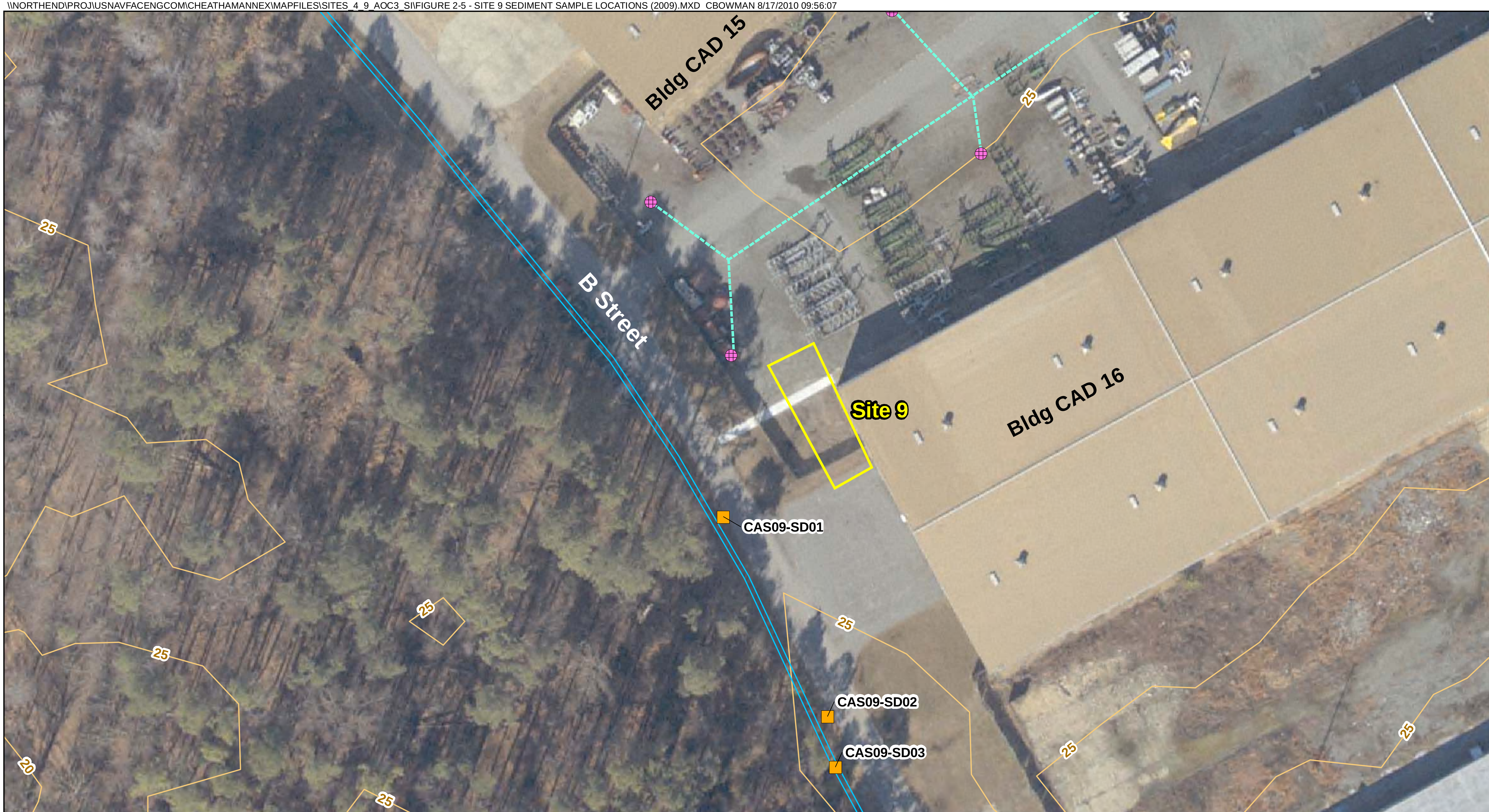


Figure 2-4
Site 9 Soil and Groundwater Sample Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 2-5 - SITE 9 SEDIMENT SAMPLE LOCATIONS (2009).MXD CBOWMAN 8/17/2010 09:56:07



Legend

- Sediment Sample Location
- Drop-In Box
- Study Area Boundary
- Storm Water Line
- Elevation Contour (5 ft interval)
- Surface Drainage

N

0 60 120 Feet

Figure 2-5
Site 9 Sediment Sample Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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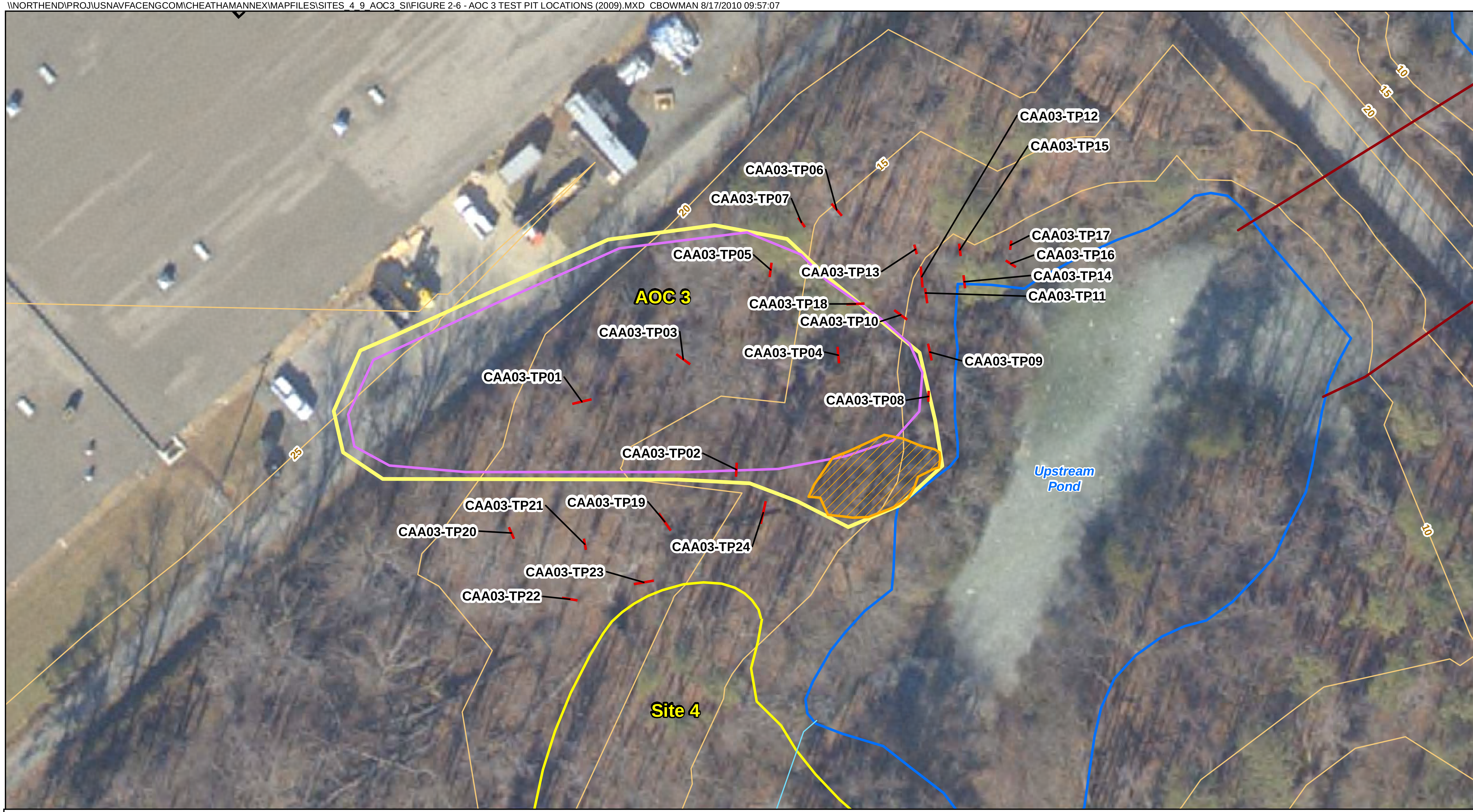
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 2-6 - AOC 3 TEST PIT LOCATIONS (2009).MXD CBOWMAN 8/17/2010 09:57:07



Legend

- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Study Area Boundary
- 2009 SI Test Pit
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

N

0 40 80 Feet

Figure 2-6
AOC 3 Test Pit Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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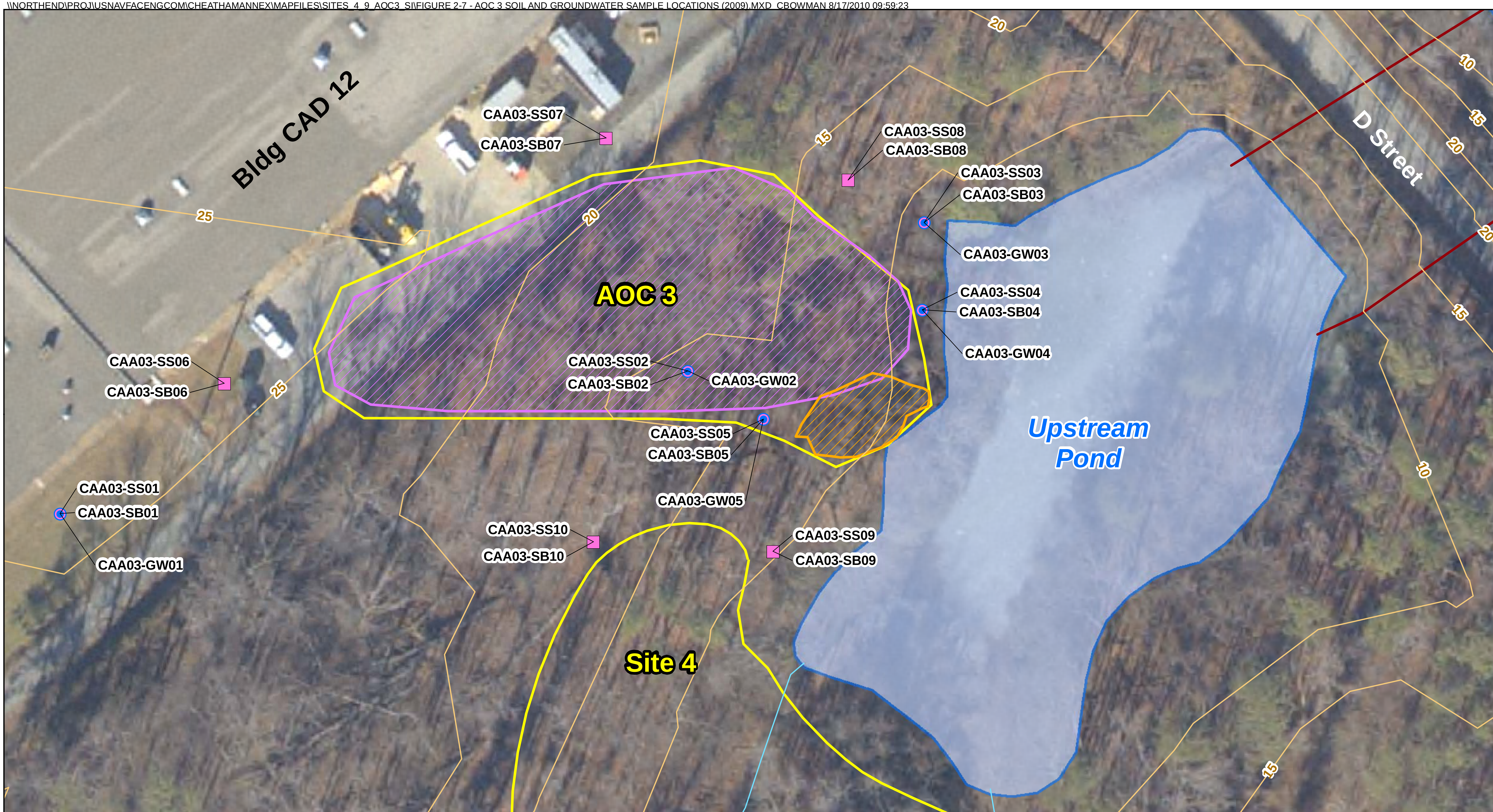
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 2-7 - AOC 3 SOIL AND GROUNDWATER SAMPLE LOCATIONS (2009).MXD CBOWMAN 8/17/2010 09:59:23



Legend

- Well Point and DPT Soil Sample Location
- Trench Soil Sample Location
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Disturbed Area (1955 Aerial Photograph)
- Surface Debris Pile

N

0 40 80 Feet

Figure 2-7
AOC 3 Soil and Groundwater Sample Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

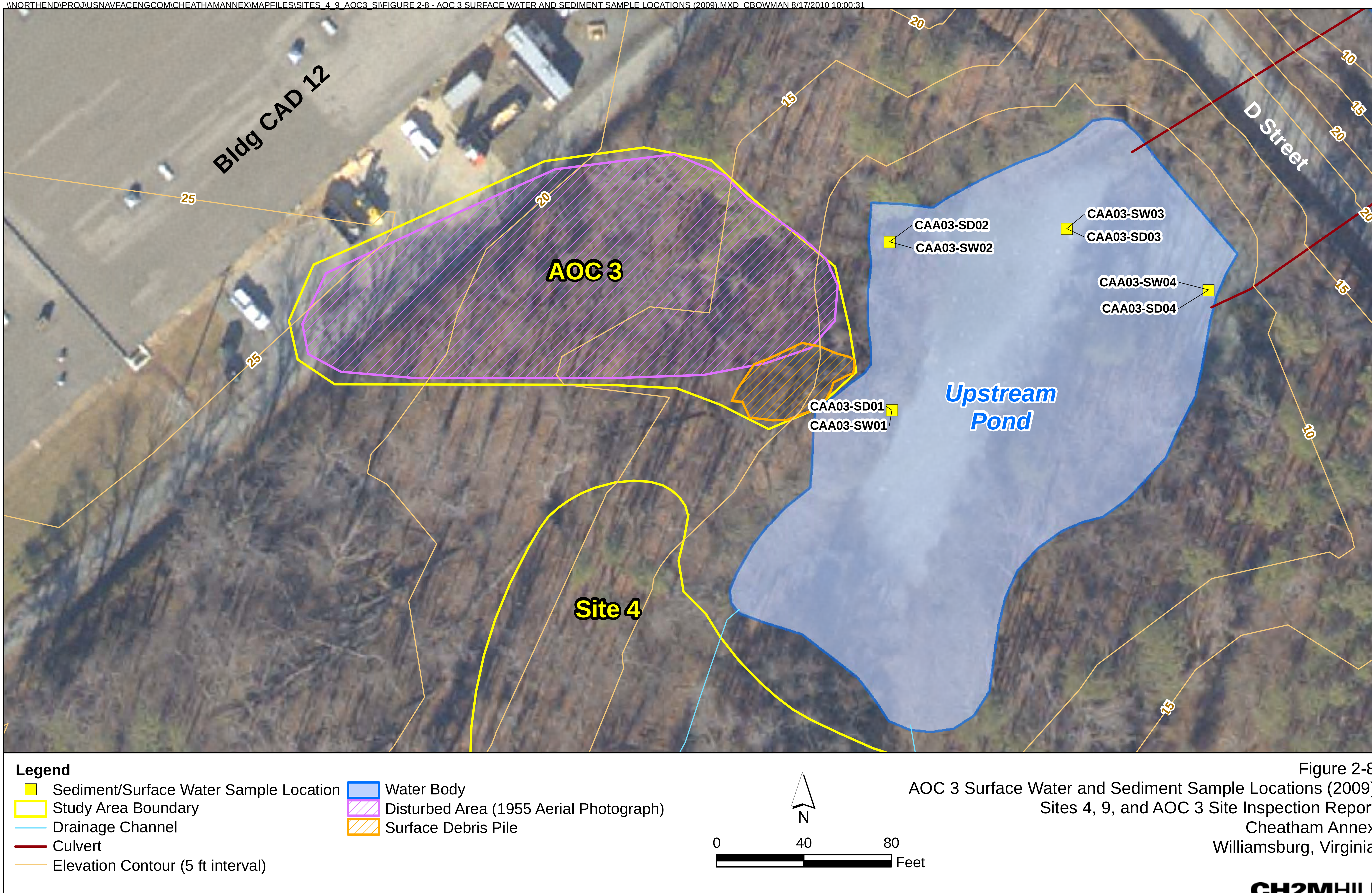


Figure 2-8
AOC 3 Surface Water and Sediment Sample Locations (2009)
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

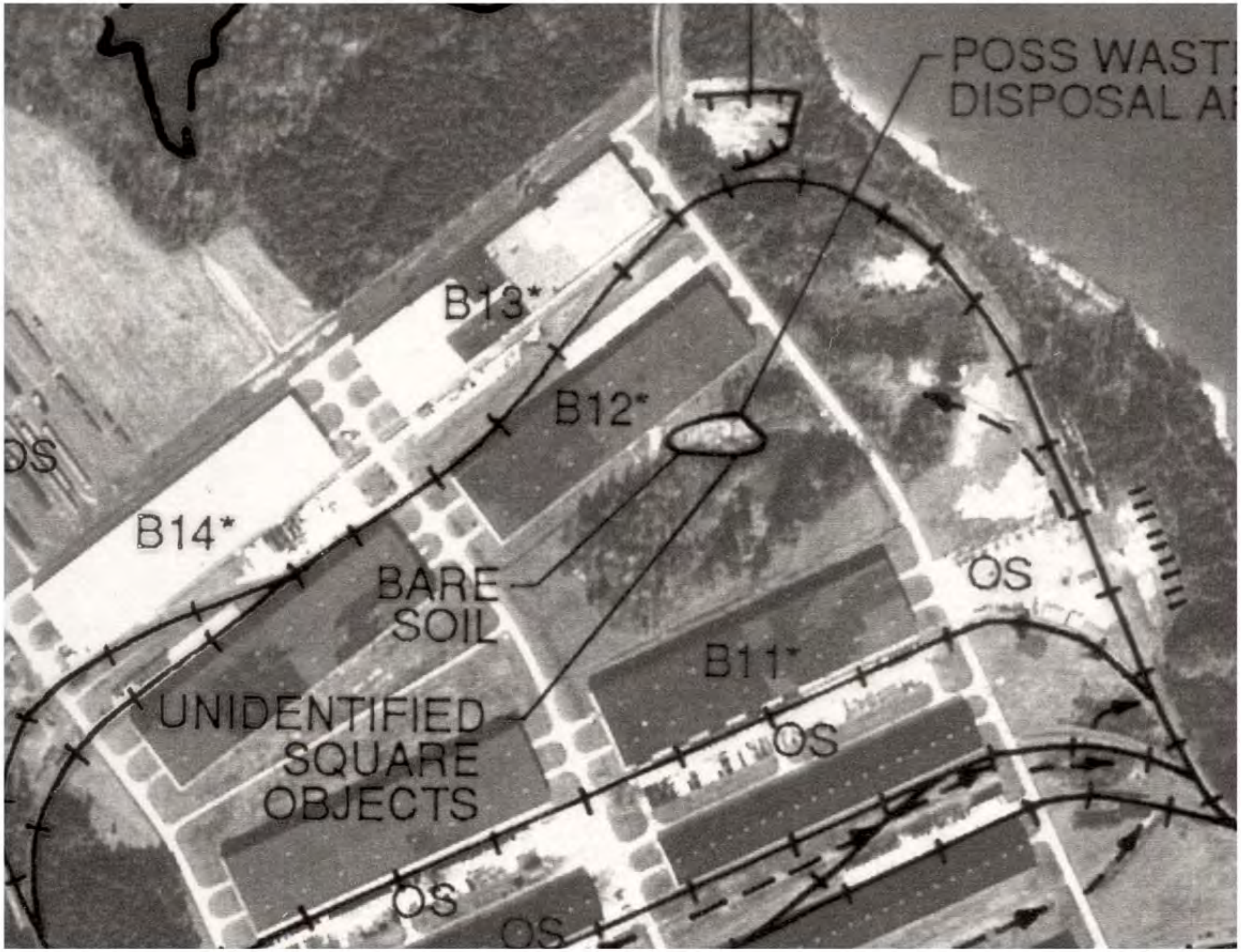


Figure 2-9
1955 Aerial Photograph of AOC 3
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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SECTION 3

Site 4—Outdated Medical Supply Disposal Area

This section presents an evaluation of the results from the SI performed at Site 4. The section includes a summary of the previous investigations conducted at the site, the conceptual site model, and the release assessment decision analysis. Sediment and surface water samples collected from Upstream Pond were used to evaluate the pond as a whole and are discussed in **Section 5**.

3.1 History of Investigations

The following investigations were previously conducted and documented at Site 4:

- *Initial Assessment Study of Naval Supply Center (Norfolk) Cheatham Annex and Yorktown Fuels Division* (NEESA, 1984)
- *Site Inspection Report, Site 4 and AOC 1, Naval Weapons Station Yorktown, Yorktown, Virginia, Cheatham Annex Site* (Baker, 2001a)
- *Trenching Letter Report Site 1, Site 4, and AOC 2, Naval Weapons Station Yorktown Cheatham Annex Site, Williamsburg, Virginia* (Baker, 2002)
- *Screening-Level Ecological Risk Assessment Report for Sites 4 and 9, Naval Weapons Station Yorktown Cheatham Annex, Williamsburg, Virginia* (Baker, 2005a)

3.2 Conceptual Site Model

The conceptual site model for Site 4 is based on the data collected as part of the previous investigations and the SI. The conceptual site model interprets the physical characteristics, the distribution of contamination and potential contaminant source, potential migration pathways, and the potential exposure and receptor pathways. The conceptual site model for Site 4 is shown in **Figures 3-1 and 3-2**.

3.2.1 Site History and Potential Sources of Release

The site consists of surface and buried debris. Surface debris includes railroad ties, metal, and various trash (Baker, 2002) as well as construction materials scattered across the site. Buried debris includes fill material (sand and silt, some gravel, cobbles, and bricks) with various thicknesses of medical supplies to about 5 feet bgs, overlying native soil. Buried material appears to be thickest in the eastern portion of the site.

In 1968/1969, out-of-date medical supplies, including intravenous injection sets with syringes wrapped in aluminum foil or plastic, empty intravenous (IV) bottles, numerous sharps, both metal and plastic, and one-inch metal banding were disposed within Site 4 on the bank of the Upstream Pond and covered with soil (NEESA, 1984). As much as 7,000 cubic yards (cy) of material was reported to have been disposed; however, in 2002, the volume of medical supplies as well as overburden soil was estimated at 2,100 cy (Baker, 2002). Syringes and tubing have been reported in Upstream Pond.

1998 Debris Removal

In May 1998, approximately 200 pounds of surface debris and 13 pounds of sharps (metal and plastic) were removed from the site. This work is documented in Appendix A of the Site Inspection Report (Baker, 2001a). Surface debris removed included IV injection sets, many contained in aluminum or plastic bags, and small quantities (15 containers) of injectable drugs. The injectable drug containers contained either residue or small volumes (a few milliliters of liquid) and had either no labels or labels that were not legible. Additional surface debris, including metal banding, railroad ties, metal, corroded 55 gallon drums, and beverage containers, was observed at the site, but not removed. Three areas of multiple debris layers were identified. Two areas are located in creek beds and their banks and the third was observed at the bottom of the hill where the marshy area and Upstream Pond intersect.

1999 Field Investigation

In November 1999, soil samples were collected from the site (**Figure 3-3**), and sediment samples were collected from Upstream Pond. Six shallow hand auger borings were placed in areas of heavy debris or immediately downgradient of heavy debris at Site 4 (4-HA01 through 4-HA06). One surface sample (0 to 0.5 feet bgs) and one subsurface sample were collected from each boring location. Subsurface samples were collected at the 1-2 feet interval at all but two locations where the interval was 0.5 to 1 foot due to encountering groundwater at 1 foot bgs. A subsurface sample could not be collected at 4-HA01 due to encountering refusal. Although sample location 4-HA06 is named as a Site 4 location, it is within the bounds of AOC 3 and is evaluated with samples collected from AOC 3 in this SI Report.

Sediment samples were collected from four locations at two separate intervals, 0 to 4 inches bgs and 4 to 8 inches bgs (4-SD01 through 4-SD04). Although these sample locations were collected as part of Site 4 activities, they are evaluated as part of Upstream Pond, discussed in **Section 5** of this SI Report.

These samples were analyzed for TCL Organics (VOCs, SVOCs, pesticides, and PCBs), TAL inorganics, cyanide, and explosive compounds. Results were summarized in the *Final Site Inspection Report Site 4 and AOC 1* (Baker, 2001a) and are evaluated as part of this SI Report.

2001 Test Trench Excavation

In November 2001, 14 test trenches (4-TT01 through 4-TT14) and six test holes (4TH01 through 4TH06) were excavated and examined to characterize and delineate the extent and types of buried waste (**Figure 3-3**). Based on the trenching results, the southern, eastern, and the south-western subsurface debris boundaries were delineated. Buried material was observed to be thickest in the eastern portion of the site where waste was encountered to 5 feet bgs. The volume of estimated buried material and overburden was then estimated at 2,100 cy. Surface debris consisting of railroad ties, metal, and various trash was also encountered along the northern and western edges of the Site 4 disposal area.

Results from this investigation are summarized in the *Final Trenching Letter Report Site 1, Site 4, and AOC 2* (Baker, 2002) and are evaluated as part of this SI Report.

Screening Ecological Risk Assessment

A Screening Ecological Risk Assessment (SERA) was completed for soil, sediment and surface water to determine if potential risk to ecological receptors warranted either additional investigation beyond the conservative screening steps of the Ecological Risk Assessment (ERA) process, or the removal of sites from further ecological consideration. The second objective was to identify any data gaps or areas of uncertainty that would require the collection of additional data to support ERA evaluations beyond the screening level.

Soil sample data collected from Site 4 and sediment sample data collected from Upstream Pond in 1999 (Baker, 2001a), and sediment sample data and surface water sample data collected from Youth Pond in 2000 (Baker, 2001b), were considered in this evaluation. Results of the SERA are presented in the *Screening Level Ecological Risk Assessment Report of Sites 4 and 9* (Baker, 2005a) and indicate that there are multiple chemicals of potential concern (COPCs) in these media (VOCs, SVOCs, pesticides, PCBs, inorganics, and explosives). The conclusion of this report was a recommendation to proceed with Step 3a of the ERA process since multiple COPCs and complete exposure pathways were identified for Site 4. The SERA also concluded that insufficient data were available at Site 4 to conduct Step 3a of the ERA process.

2009 Site Inspection Activities

Site 4 investigation activities include test pit excavation, surface and subsurface soil sampling, temporary monitoring well installation, groundwater sampling, temporary monitoring well abandonment, and surface water and sediment sampling from the site drainage channels. An explanation for each activity and methods of sample collection are documented in Section 2.

3.2.2 Physical Setting

Topography and Surface Water

Site 4 is approximately one acre in size and located upslope of Upstream Pond and AOC 3 to the southwest and south, respectively. The topography in the area slopes northeast towards Upstream Pond (**Figure 3-3**). The area is heavily vegetated with shrubs and trees.

Drainage from Outfall 2 and runoff from the areas surrounding CAD Buildings 11 and 12, flows through the Site 4 drainage channels (**Figure 3-3**) and into Upstream Pond. Surface water in Upstream Pond flows through a culvert under D Street and into Youth Pond (the culvert could not be located during sampling activities). Surface water in Youth Pond then discharges through a culvert into the York River. The presumed directions of runoff and surface water flow are shown in the CSM (**Figures 3-1** and **3-2**).

Hydrogeology

In general, soil at Site 4 is predominately brown and gray silty sand. Soil boring logs from the SI field activities present descriptions of the soil and general subsurface geology and are included as **Appendix E**.

The first encountered groundwater underlying Site 4 is the Yorktown Eastover Aquifer and was encountered between approximately 6 and 10 feet bgs. Groundwater is estimated to flow northeast towards Upstream Pond.

Current and Future Land Use

Site 4 is currently a wooded area between CAD buildings 11 and 12. While Site 4 is located within the restricted CAD area, access is not restricted to CAX visitors (e.g., civilian employees and military personnel) since the gate along D Street near CAD Building 11 is no longer locked on a regular basis. Future land use at Site 4 is not expected to change and will likely continue as a wooded area in the foreseeable future.

3.2.3 Distribution of Contamination

Data collected during the 1999 Field Investigation, the 2001 Test Trench Excavation and the 2009 SI field activities were evaluated as part of this SI Report (**Figure 3-3**). **Tables 3-1** through **Table 3-6** summarize all constituents detected in Site 4 surface soil, subsurface soil, groundwater, surface water, surface sediment, and subsurface sediment samples collected from Site 4. Additional sediment and surface water samples were collected from Upstream Pond during the Site 4 2009 SI field activities; however these analytical results were used to evaluate the pond as a whole and are discussed in **Section 5**. The tables also identify screening criteria exceedances. All analytical data for all samples are provided in **Appendix I**.

Buried Debris

During the 2001 test trench evaluation, 14 test trenches (4TT01 through 4TT14) were excavated to a maximum length of 25 feet and a maximum depth of 10 feet bgs (**Figure 3-4**) to delineate the extent of buried debris at Site 4. Trenches were advanced until native soil was encountered. In addition, in order to further characterize Site 4, six test holes (4TH01 through 4TH06) were advanced using a post hole digger to excavate to a maximum depth of 1 foot bgs (**Figure 3-4**). Buried debris, including medical supplies, metal, and construction/ fill debris, was encountered in eight of the test trenches and two test holes to a maximum depth of 7.5 feet bgs. Results of the test trench evaluation indicated that the southern, eastern, and western boundaries of buried debris had been delineated (Baker, 2002).

In October, 2009, two test pits (CAS04-TP01 and CAS04-TP02) were excavated to delineate the extent of buried debris along the northern boundary. Both test pits were free of debris, thus delineating the northern boundary of buried debris; no additional test pits were excavated. The estimated extent of buried debris at Site 4 is depicted on **Figure 3-4**.

Soil

In total, 10 surface soil and nine subsurface soil samples were collected from Site 4 (**Table 2-1**) during the 1999 field investigation (CAS004-4HA01 [surface soil], and CAS004-4HA02 through CAS004-4HA05 [surface and subsurface soil]) and the 2009 SI field activities (CAS04-SS/SB01 through CAS04-SS/SB05). These locations were chosen to fill data gaps of visual inspection between test pit locations as well as to fill any analytical data gaps from these areas within Site 4.

Soil samples collected during the 1999 field investigation were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), TCL explosives, TAL total metals, and cyanide. Soil samples collected during the 2009 SI field activities were analyzed for TCL VOCs, TCL SVOCs, SIM PAHs, TCL pesticides/PCBs, TAL total metals, cyanide, TOC, pH, and grain size.

Volatile Organic Compounds

No VOCs exceeded any screening criterion in surface soil (**Figure 3-5**). Four VOCs (chloroform, ethylbenzene, methylene chloride, and tetrachloroethene [PCE]) only exceeded the SSL in one subsurface soil sample (**Figure 3-6**).

Chloroform and methylene chloride are common laboratory contaminants and are not likely site-related. Although ethylbenzene exceeded the SSL, it was not detected in groundwater at the site. PCE was detected above a screening criterion in groundwater, but only upgradient of the site and not in the vicinity of the soil SSL exceedance.

Semivolatile Organic Compounds

Seven SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene) exceeded at least one screening criterion on surface soil (**Figure 3-5**). Six SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene bis (2-Ethylhexyl)phthalate, and di-n-butylphthalate) exceeded at least one screening criterion in subsurface soil (**Figure 3-6**).

- Benzo(a)anthracene and benzo(a)pyrene were the most frequently detected SVOCs at Site 4, exceeding screening criteria in six and seven surface soil samples, respectively. The maximum benzo(a)anthracene concentration of 1,100 micrograms per kilogram (µg/kg) exceeded the residential RSL of 150 µg/kg. The maximum benzo(a)pyrene concentration of 2,300 µg/kg also exceeded the residential RSL of 15 µg/kg.
- Benzo(a)pyrene and benzo(b)fluoranthene, both exceeding screening criteria in two subsurface soil samples, were the most frequently detected SVOCs in Site 4 subsurface soil. The maximum benzo(a)pyrene and benzo(b)fluoranthene concentrations of 550 µg/kg and 510 µg/kg, respectively, were detected above their respective residential RSLs (15 µg/kg and 150 µg/kg).
- Although SVOCs in soil were detected above their respective SSLs, no SVOCs were detected in Site 4 groundwater.

Pesticides/Polychlorinated Biphenyls

Six pesticides (4,4'- dichlorodiphenyltrichloroethane [4,4′-DDT], aldrin, endrin, endrin aldehyde, endrin ketone, and gamma-chlordane) exceeded at least one screening criterion in surface soil (**Figure 3-5**). Five pesticides (4,4'-DDT, aldrin, endosulfan II, endrin ketone and heptachlor) exceeded at least one screening criterion in subsurface soil (**Figure 3-6**).

Pesticides were not known to be disposed of at Site 4. The low detected concentrations are likely attributable to normal pesticide use at Department of Defense (DoD) facilities to control pests and weeds, and not from the disposal of pesticides. The legal application of pesticides is not a CERCLA-regulated release.

Two PCBs, Aroclor-1242 and Aroclor-1260, exceeded at least one screening criterion in surface and subsurface soil (**Figures 3-5** and **3-6**).

- The highest PCB detections exceeding multiple screening criteria (background, SSLs, and residential RSLs) were detected in surface and subsurface soil samples collected next to the drainage channels (CAS004-4HA04 and CAS004-4HA05) during the 1999 field investigation. Aroclor-1254 was detected at a maximum concentration of 1,000 µg/kg in surface soil and 2,300 µg/kg in subsurface soil. Aroclor-1260 was detected at a maximum concentration of 2,700 µg/kg in surface soil and 1,600 µg/kg in subsurface soil. The residential RSL for Aroclor-1254 and Aroclor-1260 are 5.3 µg/kg and 24 µg/kg, respectively.

- Those surface and subsurface soil samples collected from all other locations, farther away from the drainage channels, either had no PCB detections or the concentrations only exceeded the SSLs. PCBs were not detected in groundwater at the site.

Explosives

No explosives were detected in surface and subsurface soil.

Inorganic Constituents

Eleven inorganics (aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, selenium, vanadium, and zinc) exceeded at least one screening criterion and background concentrations in surface soil (**Figure 3-7**). Seven inorganics (aluminum, arsenic, chromium, mercury, selenium, vanadium, and zinc) exceeded at least one screening criterion and background concentrations in subsurface soil (**Figure 3-8**).

- Of the 11 inorganics that exceeded multiple screening criteria in surface soil, the most-frequently detected were chromium and mercury (three exceedances each) at maximum concentrations of 45.2 milligrams per kilogram (mg/kg) and 0.88 mg/kg, respectively. The residential RSL for chromium and mercury are 0.29 mg/kg and 2.3 mg/kg, respectively and the ecological screening values for chromium and mercury are 64.0 mg/kg and 0.10 mg/kg, respectively.

- Of the seven inorganics that exceeded multiple screening criteria in subsurface soil, the most detected were aluminum, mercury, vanadium, and zinc (three exceedances each) at maximum concentrations of 29,400 mg/kg, 0.91 mg/kg, 57.5 mg/kg, and 373 mg/kg, respectively. The residential RSLs for aluminum, mercury, vanadium, and zinc are 7,700 mg/kg, 2.3 mg/kg, 39 mg/kg, and 2,300 mg/kg, respectively and the ecological screening values for mercury, vanadium, and zinc are 0.10 mg/kg, 130 mg/kg, and 120 mg/kg, respectively

Groundwater

Groundwater samples were collected from four temporary monitoring wells (CAS04-GW01 through CAS04-GW04) during the 2009 SI field activities. Since no groundwater samples had previously been collected from Site 4, the sample locations were chosen by placing some locations within areas of known subsurface debris as well as locations outside the boundary of subsurface debris in order to best represent all surficial aquifer conditions at Site 4.

All groundwater samples were analyzed for TCL Organics (VOCs, SVOCs, pesticides/ PCBs), SIM PAHs, and TAL total and dissolved metals, mercury, and cyanide.

Volatile Organic Compounds

One VOC, PCE (1.1 µg/L), exceeded the adjusted Tapwater RSL of 0.11 µg/L in groundwater at a monitoring well located upgradient of the site (**Figure 3-9**). The source of PCE at this upgradient well location is not known.

Semivolatile Organic Compounds
No SVOCs were detected in groundwater.

Pesticides/Polychlorinated Biphenyls
No pesticides or PCBs were detected in groundwater.

Inorganic Constituents
Three total inorganics (arsenic, iron, and manganese) and two dissolved inorganics (arsenic and manganese) exceeded at least one screening criterion in groundwater (**Figure 3-9**).

The maximum concentrations of arsenic (7.4J μg/L, total) and manganese (179 μg/L, dissolved) were only slightly higher than their respective background concentrations of 2.28 and 49.5 μg/L and are likely attributable to background conditions. In addition, although total iron concentrations (5,010 μg/L) exceeded the adjusted Tapwater RSL of 2,600 μg/L, it did not exceed any screening criteria in the dissolved fraction.

Surface Water

In total, five surface water samples were collected from the Site 4 drainage ditches (**Table 2-1**) during the 2009 SI field activities (CAS04-SW05 through CAS04-SW09). Locations were chosen in order to determine the origin(s) of surface contamination as well as contaminant transport pathways to receptors. Surface water samples were collected from Upstream Pond during the Site 4 2009 SI field activities; however, these analytical results were used to evaluate the pond as a whole and are discussed in **Section 5**.

Surface water samples were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, TAL total and dissolved metals, cyanide, and hardness. Samples collected from within the Upstream Pond were also analyzed for AVS/SEM.

Volatile Organic Compounds
No VOCs were detected in surface water (**Table 3-4**).

Semivolatile Organic Compounds
One SVOC, pyrene, exceeded the ecological screening value (0.025 μg/L) in three surface water samples (**Figure 3-10**).

Pesticides/Polychlorinated Biphenyls
No pesticides or PCBs were detected in surface water.

Inorganic Constituents
Five total inorganics (aluminum, arsenic, barium, iron and manganese) and four dissolved inorganics (arsenic, barium, iron, and manganese) exceeded one or more screening criterion in surface water (**Figure 3-10**).

With the exception of arsenic and iron, these inorganics exceeded only their respective ecological screening value. Arsenic exceeded only the adjusted residential RSL (0.45 μg/L) at a concentration of 58 μg/L and iron exceeded the RSL (26,000 μg/L) and the ecological screening value (1,000 μg/L) at a concentration of 30,300 μg/L in one surface water sample, CAS04-SW09.

Sediment

In total, five surface and subsurface sediment samples were collected from the Site 4 drainage ditches (**Table 2-1**) during the 2009 SI field activities (CAS04-SD05 through CAS04-SD09). Surface sediment sample locations were collected from 0-4 inches bgs and subsurface sediment sample locations were collected from 4-8 inches bgs. The sediment sample locations were chosen to best represent depositional areas where contaminants are likely to have migrated. Sediment samples were collected from Upstream Pond during the Site 4 2009 SI field activities; however, these analytical results were used to evaluate the pond as a whole and are discussed in **Section 5**.

Sediment samples collected during the 2009 SI field activities were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, TAL total metals, cyanide, TOC, pH, and grain size.

Volatile Organic Compounds

No VOC concentrations were observed above screening criteria.

Semivolatile Organic Compounds

Twelve SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, PAH (high molecular weight [HMW]), PAH (low molecular weight [LMW]), PAH (total), phenanthrene, and pyrene) exceeded at least one screening criterion in surface sediment (**Figure 3-11**). Two SVOCs (benzo(a)anthracene and dibenz(a,h)anthracene) exceeded at least one screening criterion in subsurface sediment (**Figure 3-12**).

SVOC exceedances were isolated to one sediment sample, CAS04-SD05, the most upstream sediment sample location along that particular drainage channel.

Pesticides/Polychlorinated Biphenyls

Five pesticides (4,4′- dichlorodiphenyldichloroethane [4,4′-DDD], 4-4′- dichlorodiphenyldi-chloroethene [4,4′-DDE], 4-4′-DDT, endrin aldehyde, and gamma-chlordane) exceeded at least one screening criterion in surface sediment (**Figure 3-11**). Five pesticides (4,4′-DDD, 4-4′-DDE, 4-4′-DDT, dieldrin, and endrin aldehyde) exceeded at least one screening criterion in subsurface sediment (**Figure 3-12**).

Pesticides were not known to be disposed of at Site 4. Detected concentrations are likely attributable to normal pesticide application at DoD facilities to control pests and weeds. The legal application of pesticides does not constitute a CERCLA-regulated release.

Two PCBs (Aroclor-1254 and Aroclor-1260) exceeded the ecological screening criteria in one surface and two subsurface sediment samples (**Figures 3-11** and **3-12**).

Inorganic Constituents

Three inorganics (arsenic, barium, and chromium) exceeded at least one screening criterion in surface sediment (**Figure 3-11**). Seven inorganics (aluminum, arsenic, barium, cadmium, chromium, iron and vanadium) exceeded at least one screening criterion in subsurface sediment (**Figure 3-12**).

Chromium, the most detected inorganic, exceeded the RSL (2.9 mg/kg) in all surface sediment sample locations at a maximum concentration of 27.2 mg/kg. Of the exceedances, chromium was the most detected inorganic at a maximum concentration of 27.2 mg/kg. The RSL for chromium is 2.9mg/kg.

Arsenic and chromium were detected in all subsurface sediment samples at concentrations exceeding their respective RSLs (3.9 mg/kg [arsenic] and 2.9 mg/kg [chromium]) at maximum concentrations of 13.2 mg/kg and 71.8 mg/kg, respectively.

3.2.4 Potential Exposure and Receptor Pathways

Potential receptors at Site 4 include current/potential future industrial workers, current/potential future trespassers, potential future construction workers, potential future residents, animals (i.e., birds and mammals), terrestrial organisms (i.e., soil invertebrates, reptiles, amphibians), aquatic organisms (i.e., benthic and aquatic invertebrates, fish, reptiles, amphibians) and terrestrial, wetland and aquatic plants.

Human Health Risk Evaluation

The human health risk screening/risk-ratio evaluation for Site 4 is presented in **Appendix A**. The evaluation was conducted in three steps using a risk ratio technique (Navy, 2000). The supporting tables for the evaluation are presented in **Appendix A, Attachment A.1**. An overview of the various potential receptors and exposure pathways addressed in the risk evaluation is presented in the human health CSM, **Figure A-1** of **Appendix A**. The results of the human health risk evaluation for Site 4 are summarized below.

Surface Soil

The risk-based screening/risk ratio evaluation for surface soil at Site 4 is provided in **Appendix A, Attachment A.1, Tables 2.1** through **2.1b**.

In Step 1, 13 constituents were detected in surface soil samples above background and the human health risk-based screening levels, and were identified as COPCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, aldrin, Aroclor-1242, Aroclor-1260, aluminum, arsenic, chromium, iron, and vanadium.

Carbazole was detected in surface soil at Site 4, but no screening criteria are available. Therefore, potential risks could not be evaluated for this constituent.

In Step 2, based on the use of the maximum detected concentration of each COPC, a cumulative cancer risk of 4×10^{-4} was calculated; this value was greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ hazard indices (HIs) calculated for the COPCs ranged from 0.2 to 0.5; these HI values did not exceed the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, aldrin, Aroclor-1242, Aroclor-1260, arsenic, and chromium.

In Step 3, based on the use of the 95 percent UCL for the exposure point concentrations (EPC), a cumulative cancer risk of 3×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, aldrin, Aroclor-1242, Aroclor-1260, arsenic, and chromium. Benzo(a)pyrene and chromium each contribute individual cancer risks above 5×10^{-5}.

Exposure to surface soil at Site 4 may result in unacceptable human health risks associated with PAHs, pesticides/PCBs, and inorganics, based on potential human exposure. The highest concentrations of PAHs, pesticides, and PCBs were detected in samples collected in 1999.

Subsurface Soil

The risk-based screening/risk ratio evaluation for subsurface soil at Site 4 is provided in **Appendix A, Attachment A.1, Tables 2.2** through **2.2b**.

In Step 1, nine constituents were detected in subsurface soil samples above background and the human health screening levels, and were identified as COPCs: benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, Aroclor-1242, Aroclor-1260, aluminum, arsenic, chromium, and vanadium.

In Step 2, based on the use of the maximum detected concentration of each COPC, a cumulative cancer risk of 2×10^{-4} was calculated; this value was greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs ranged from 0.1 to 0.4; these HI values did not exceed the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk were identified as COPCs and included benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethyl-hexyl)phthalate, Aroclor-1242, Aroclor-1260, arsenic, and chromium.

In Step 3, based on the use of the 95 percent UCL for the EPC, a cumulative cancer risk of 2×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, Aroclor-1242, Aroclor-1260, arsenic, and chromium. Chromium was the only COPC to contribute an individual cancer risk above 5×10^{-5}.

Exposure to subsurface soil at Site 4 may result in unacceptable human health risks associated with PAHs, pesticides/PCBs, and inorganics, based on potential human exposure. The potential unacceptable carcinogenic risk is primarily associated with chromium, the only COPC to contribute to a risk above the screening benchmark level. However, in performing the risk assessment, it was assumed that all of the chromium detected in the soil is in the hexavalent form, which is very unlikely. Chromium is generally found in natural soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, trivalent chromium is the form of chromium expected to be present at the site. Chromium was identified as a COPC in soil when screened against the respective RSLs for hexavalent chromium. However, the maximum detected concentration for chromium in soil was less than the RSL for trivalent chromium. Therefore, it is likely there would be no unacceptable carcinogenic risk associated with exposure to the subsurface soil.

The highest concentrations of PAHs, pesticides, and PCBs were detected in samples collected in 1999.

Groundwater

The risk-based screening/risk ratio evaluation for groundwater at Site 4 is provided in **Appendix A, Attachment A.1, Tables 2.3** and **2.3a**.

In Step 1, four constituents were detected in groundwater samples above background and the human health screening levels, and were identified as COPCs: PCE, arsenic, iron, and manganese.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 2×10^{-4} was calculated; this value was greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs were 0.2; these HI values were less than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included PCE and arsenic. Arsenic was the only COPC to contribute an individual cancer risk above 5×10^{-5}.

Step 3 was not performed because less than five samples were available for groundwater.

Exposure to groundwater at Site 4 may result in unacceptable human health risks associated with PCE and arsenic, based on potential human exposure.

Indoor Air (Vapor Intrusion from Groundwater)

The risk-based screening/risk ratio evaluation for indoor air at Site 4 is provided in **Appendix A, Attachment A.1, Table 2.4**. The Step 2 and Step 3 risk ratio evaluations were not conducted for the vapor intrusion evaluation. The exceedance of vapor intrusion screening levels is an indication that further evaluation (e.g., multiple lines of evidence investigation) may be warranted.

One constituent was detected in groundwater samples above the vapor intrusion screening level, and was identified as a COPC: PCE.

Exposure to indoor air at Site 4 may result in unacceptable human health risks associated with PCE.

Surface Water (Drainage Ditches)

The risk-based screening/risk ratio evaluation for surface water in drainage ditches at Site 4 is provided in **Appendix A, Attachment A.1, Tables 2.5** through **2.5b**.

In Step 1, two constituents were detected in surface water samples above the human health screening levels, and were identified as COPCs: arsenic and iron.

In Step 2, based on the maximum detected concentration for the one carcinogenic COPC, a cumulative cancer risk of 1×10^{-3} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the one noncarcinogenic COPC was 1; this value was greater than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk or cumulative target organ HI above 0.5 were identified as COPCs, and included arsenic and iron.

The Step 3 results were the same as Step 2.

Exposure to surface water in the drainage ditches at Site 4 may result in unacceptable human health risks associated with arsenic and iron, based on potential human exposure. The potential unacceptable carcinogenic risk is associated with arsenic; arsenic was only detected in one of the five surface water samples. Iron, the only contributor to the potential noncariconogenic hazard is considered an essential human nutrient.

Sediment (Drainage Ditches)

The risk-based screening/risk ratio evaluation for surface and subsurface sediment in the drainage ditches at Site 4 is provided in **Appendix A, Attachment A.1, Tables 2.6** through **2.7b**.

In Step 1, three constituents were detected in surface sediment (0-4 inches) above the human health screening levels, and were identified as COPCs: benzo(a)pyrene, arsenic, and chromium. Carbazole and thallium were also detected, but did not have any available screening criteria; potential human health risks associated with these constituents could not be evaluated.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 1×10^{-4} was calculated; this value greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs and included: benzo(a)pyrene, arsenic, and chromium.

In Step 3, based on the use of the 95 percent UCL for the EPC, a cumulative cancer risk of 1×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene, arsenic, and chromium. Chromium was the only COPC to contribute an individual cancer risk above 5×10^{-5}.

Exposure to surface sediment at Site 4 may result in unacceptable human health risks associated with benzo(a)pyrene, arsenic, and chromium, based on potential human exposure. The potential unacceptable carcinogenic risk is primarily associated with chromium, the only COPC to contribute to a risk above the screening benchmark level. However, in performing the risk assessment, it was assumed that all of the chromium detected in the surface sediment is in the hexavalent form, which is very unlikely. Chromium is generally found in natural sediment in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, trivalent chromium is the form of chromium expected to be present at the site. Chromium was identified as a COPC in surface sediment when screened against the respective RSLs for hexavalent chromium. However, the maximum detected concentration for chromium in surface sediment was less than the RSL for trivalent chromium. Therefore, it is likely there would be no unacceptable carcinogenic risk associated with exposure to the surface sediment in the drainage ditches at Site 4.

In Step 1, two constituents were detected in subsurface sediment (4 to 8 inches) above the human health screening levels, and were identified as COPCs: arsenic and chromium. Carbazole was also detected, but did not have any available screening criteria; potential risks associated with this constituent could not be evaluated.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 3×10^{-4} was calculated; this value was greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: arsenic and chromium.

In Step 3, based on the use of the 95 percent UCL for the EPC, a cumulative cancer risk of 3×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: arsenic and chromium. Chromium was the only COPC to contribute an individual cancer risk above $5x10^{-5}$.

Exposure to subsurface sediment at Site 4 may result in unacceptable human health risks associated with arsenic and chromium, based on potential human exposure. The potential unacceptable carcinogenic risk is primarily associated with chromium, the only COPC to contribute to a risk above the screening benchmark level. However, in performing the risk assessment, it was assumed that all of the chromium detected in the subsurface sediment is in the hexavalent form, which is very unlikely. Chromium is generally found in natural sediment in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, trivalent chromium is the form of chromium expected to be present at the site. Chromium was identified as a COPC in subsurface sediment when screened against the respective RSLs for hexavalent chromium. However, the maximum detected concentration for chromium in subsurface sediment was less than the RSL for trivalent chromium. Therefore, it is likely there would be no unacceptable carcinogenic risk associated with exposure to the subsurface sediment in the drainage ditches at Site 4.

Ecological Risk Evaluation

The ecological risk screening was performed to determine the potential for ecological risks associated with direct exposure to site media at Site 4 (surface and subsurface soils, surface water, and surface and subsurface sediment). The results of the ecological risk screening (**Appendix B**) provide a preliminary indication of potential risks from exposure to COPCs identified for the site, and are used to help determine whether the site requires further evaluation or the risks are acceptable. **Table B-4** lists the samples used in this evaluation and the spatial groupings.

Surface Soil

Eight inorganics (aluminum, copper, iron, lead, manganese, mercury, selenium, and zinc) and six pesticides (4,4′-DDT, aldrin, endrin, endrin aldehyde, endrin ketone, and gamma-chlordane) exceeded screening values based upon maximum detected concentrations (**Tables B-5** and **B-6**). All of these chemicals, except manganese, also exceeded background UTLs, where available. Acetone and carbazole lacked both screening values and background UTLs. Therefore, aluminum, copper, iron, lead, mercury, selenium, zinc, 4,4′-DDT, aldrin, endrin, endrin aldehyde, endrin ketone, gamma-chlordane, acetone, and carbazole were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (120 µg/kg) that was less than soil screening values for other, similar VOCs (**Table B-1**). Thus, this chemical was not identified as a refined COPC.

- Carbazole was detected in five surface soil samples at a maximum concentration of 250 μg/kg (0.25 mg/kg). While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentrations of this chemical are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting Lethal Concentration (survival) to 50 percent of the population (LC_{50}) and Effect Concentration (reproduction) to 50 percent of the population (EC_{50}) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg. The maximum concentration of carbazole (0.25 mg/kg) is below this effects concentration. Therefore, carbazole was not identified as a refined COPC.

- The mean hazard quotients (HQs) for copper, iron, lead, selenium, zinc, 4,4′-DDT, and gamma-chlordane were less than one. Thus, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for aldrin (1.17), endrin (2.67), endrin aldehyde (4.85), endrin ketone (5.51), and mercury (2.25). These five chemicals were identified as refined COPCs.

- Aluminum exceeded its pH-based soil screening value in eight of 10 samples and the mean pH at the site was also less than the pH-based screening value. Aluminum also exceeded background in two of 10 samples. Therefore, aluminum was identified as a refined COPC.

Subsurface Soil

Five metals (aluminum, iron, mercury, selenium, and zinc), four pesticides (4,4′-DDT, aldrin, endosulfan II, and endrin ketone), bis(2-ethylhexyl)phthalate, and di-n-butylphthalate exceeded screening values based upon maximum detected concentrations (**Tables B-7** and **B-8**). All of these chemicals, except iron, also exceeded background UTLs, where available. Screening values and background UTLs were not available for acetone and 2-butanone. Therefore, aluminum, mercury, selenium, zinc, 4,4′-DDT, aldrin, endosulfan II, endrin ketone, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, acetone, and 2-butanone were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone and 2-butanone, which did not have screening values, were detected at maximum concentrations (120 and 8.00 μg/kg, respectively) that were less than soil screening values for other, similar VOCs (**Table B-1**). Therefore, these chemicals were not identified as refined COPCs.

- The mean HQs for selenium, zinc, 4,4′-DDT, endosulfan II, bis(2-ethylhexyl)phthalate, and di-n-butylphthalate were less than one. Therefore, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for aldrin (1.09), endrin ketone (2.35), and mercury (2.75). These three chemicals were identified as refined COPCs.
- Aluminum exceeded its pH-based soil screening value in eight of nine samples and the mean pH at the site was also less than the pH-based screening value. Aluminum also exceeded background in three of nine samples. Therefore, aluminum was identified as a refined COPC.

Terrestrial Food Web

HQs based upon maximum exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-9** (calculations are included in **Appendix B**). Based upon a comparison to No Observed Adverse Effect Levels (NOAELs), arsenic, cadmium, chromium, lead, mercury, selenium, zinc, Aroclor-1242, and Aroclor-1260 had HQs exceeding one for one or more receptors. Therefore, these nine chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- HQs based upon the 95 percent UCL of the arithmetic mean exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-10** (calculations are included in **Appendix B**). Based upon a comparison to NOAELs, mercury and Aroclor-1260 had HQs exceeding one for at least one receptor. There were no exceedances based upon the Lowest Observed Adverse Effect Level (LOAEL) or the Maximum Acceptable Toxicant Concentration (MATC).
- HQs based upon arithmetic mean exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-11** (calculations are included in **Appendix B**). No chemical had an HQ that exceeded one based upon the NOAEL, MATC, or LOAEL.
- Because there were no exceedances based upon the MATC or LOAEL, no refined COPCs were identified for terrestrial food web exposures, and risks from this exposure pathway are considered acceptable.

Drainage Ditches

This section evaluates the surface water and sediment from the three drainage ditches that drain to the upstream pond (**Figure 3-2**).

Surface Water

Four metals (aluminum, barium, iron, and manganese) exceeded screening values based upon maximum detected concentrations in unfiltered samples (**Tables B-12** and **B-13**). Aluminum was not detected in filtered samples (filtered samples best reflect the potential bioavailability of metals to aquatic receptors [USEPA, 2009; 1996]). Barium, iron, and manganese exceeded screening values based upon maximum detected concentrations in filtered samples. Therefore, barium, iron, and manganese were identified as initial COPCs. Pyrene also exceeded screening values and was identified as an initial COPC.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The screening value for barium (4 micrograms per liter [μg/L]) is very conservative and likely does not reflect the bioavailability of barium in the aquatic environment. Barium compounds have low toxicity to aquatic organisms, with the barium ion responsible for the toxic effects (Federal Register, 62[2]:366-372, 3 January 1997). In aquatic media, barium compounds are likely to precipitate out of solution as barium sulfate ($BaSO_4$) or barium carbonate ($BaCO_3$) when they react with the sulfate or carbonate present in most surface water. Therefore, the barium is rendered essentially non-toxic and does not present a risk to aquatic organisms. Based upon this, barium was not identified as a refined COPC in surface water.
- The mean HQ for manganese in filtered samples was less than one. Therefore, this chemical was not identified as a refined COPC.
- The mean HQ (1.15) exceeded one for iron in filtered samples and the mean HQ for pyrene (6.20) also exceeded one. Therefore, iron and pyrene were identified as refined COPCs.

Surface Sediment

Two metals (arsenic and barium), five pesticides (4,4′-DDD, 4,4′-DDE, 4,4′-DDT, endrin aldehyde, and gamma-chlordane), two PCBs (Aroclors 1254 and 1260), nine PAHs, and total PAHs (including both HMW and LMW PAHs) exceeded screening values based upon maximum detected concentrations (**Tables B-14** and **B-15**). Screening values were not available for beryllium, thallium, endosulfan I, endosulfan II, endosulfan sulfate, heptachlor, 2-butanone, acetone, carbon disulfide, and tetrachloroethene. Therefore, these 31 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The mean HQs for arsenic, all but one PAH, and total PAHs (including HMW and LMW PAH groups) were less than one. The mean HQ for dibenz(a,h)anthracene was just 1.08 and both total and HMW PAH HQs were less than one. Therefore, these 13 chemicals were not identified as refined COPCs.
- Beryllium and thallium did not have available screening values. However, these metals are not known to be associated with any site activities. Thallium was detected in only one of five samples. The small range in beryllium concentrations (0.34 to 0.65 mg/kg) suggests that this chemical may be at background concentrations. Therefore, these two metals were not identified as refined COPCs.
- Equilibrium partitioning (EqP) sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for all but one of the VOC, pesticide, and PCB initial COPCs (**Table B-14**). EqP sediment values were exceeded for only three of these chemicals (carbon disulfide, endosulfan I, and endosulfan sulfate) based upon maximum surface sediment concentrations but not based upon mean surface sediment concentrations (except for carbon disulfide). The maximum EqP-based HQ for carbon disulfide, which can be naturally produced in wetland environments, was only 1.10.

Acetone, which did not have a screening value, was detected at a maximum concentration (230 µg/kg) that was less than available values for similar chemicals (such as 2-butanone). Therefore, when bioavailability is considered for these chemicals, none were identified as refined COPCs.

- The mean HQ exceeded one for barium (1.18). However, this metal is not known to be associated with any site activities. The small range in barium concentrations (17.1 to 31.6 mg/kg) suggests that this chemical may be at background concentrations. Therefore, barium was not identified as a refined COPC.

No refined COPCs were identified for this medium and risks from this exposure pathway are considered acceptable.

Subsurface Sediment

Seven metals (aluminum, arsenic, barium, cadmium, chromium, iron, and vanadium), five pesticides (4,4′-DDD, 4,4′-DDE, 4,4′-DDT, dieldrin, and endrin aldehyde), two PCBs (Aroclors 1254 and 1260), and two individual PAH compounds (but not total PAHs) exceeded screening values based upon maximum detected concentrations (**Tables B-16** and **B-17**). Screening values were not available for beryllium, endosulfan I, endosulfan II, endosulfan sulfate, pentachlorophenol, 2-butanone, acetone, carbon disulfide, and tetrachloroethene. Therefore, these 25 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The mean HQs for aluminum, arsenic, cadmium, chromium, iron, vanadium, the two PAHs, the two PCB Aroclors, and 4,4′-DDE were less than one. Therefore, these 11 chemicals were not identified as refined COPCs.
- Beryllium did not have an available screening value. However, this metal is not known to be associated with any site activities. Therefore, this metal was not identified as a refined COPC.
- EqP sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for all but one of the VOC, SVOC, and pesticide initial COPCs (Table 6-16). EqP sediment values were not exceeded for any of these chemicals based upon maximum subsurface sediment concentrations. Acetone, which did not have a screening value, was detected at a maximum concentration (130 µg/kg) that was less than available values for similar chemicals (such as 2-butanone). Therefore, when bioavailability is considered for these chemicals, none were identified as refined COPCs.
- The mean HQ exceeded one for barium (1.47). Therefore, barium was identified as a refined COPC.

3.3 Site 4 Release Assessment Decision Analysis

This subsection discusses the sample results in the context of the Data Evaluation Decision Diagram (**Figure 1-2**), and is also summarized in **Table 3-7**.

Step 1—Determination of Potential CERCLA Eligibility and if CERCLA-eligible, has a CERCLA-regulated release occurred at the site?

Historical information indicates the site is an unlined, non-permitted disposal area where out-of-date medical supplies, including syringes and IV bottles were disposed of and covered with soil in the late 1960's (NEESA, 1984). Surface debris includes railroad ties, metal, and various trash as well as construction materials (Baker, 2002) while buried debris includes fill material (sand and silt, some gravel, cobbles, and bricks) with various thicknesses of medical supplies to about 5 feet bgs.

Because Site 4 is listed as a Site-Screening Area (SSA) within the FFA as a site that "may pose a threat, or potential threat, to human health and the environment" (Navy, 2005), and because VOCs, SVOCs, pesticides, PCBs, and inorganic constituents were observed above background levels during the SI, it is considered to be CERCLA-eligible. Site 4 is further evaluated in the decision analysis process in Step 2a.

Step 2—Does the CERCLA release pose potential unacceptable risks to human health and the environment?

Step 2a—Comparison of Data against Conservative Risk-Based Screening Values

Specifically, the data for the CERCLA-regulated constituents detected at Site 4 were compared to the screening criteria described in Section 1 and exceedances of the screening criteria are identified on **Tables 3-1 through 3-6**. Those constituents that exceed one or more criteria (and background, if available, for inorganics) are depicted in **Figures 3-3 through 3-12.**

In summary, seven SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), six pesticides (4,4'-DDT, aldrin, endrin, endrin aldehyde, endrin ketone, and gamma-chlordane), two PCBs (Aroclor-1242 and Aroclor-1260), and 11 inorganics (aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, selenium, vanadium, and zinc) exceeded one or more screening criterion in surface soil, four VOCs (chloroform, ethylbenzene, methylene chloride, and tetrachloroethene), six SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene bis (2-Ethylhexyl)phthalate, and di-n-butylphthalate), five pesticides (4,4'-DDT, aldrin, endosulfan II, endrin ketone and heptachlor), two PCBs (Aroclor-1242 and Aroclor-1260), and seven inorganics (aluminum, arsenic, chromium, mercury, selenium, vanadium, and zinc) exceeded one or more screening criterion in subsurface soil.

In groundwater, one VOC (PCE) and three total inorganics (arsenic, iron, and manganese) and two dissolved inorganics (arsenic and manganese) exceeded one or more screening criterion.

In the Site 4 drainage ditches, one SVOC (pyrene) and five total inorganics (aluminum, arsenic, barium, iron and manganese) and four dissolved inorganics (arsenic, barium, iron, and manganese) exceeded one or more screening criterion in surface water. Twelve SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, PAH (HMW), PAH (LMW), PAH (total), phenanthrene, and pyrene), five pesticides (4,4'-DDD, 4-4'-DDE, 4-4'-DDT, endrin aldehyde, and gamma-chlordane), two PCBs (Aroclor-1254 and Aroclor-1260), and three inorganics (arsenic, barium, and chromium) exceeded one or more screening criterion in surface sediment, and two SVOCs (benzo(a)anthracene and dibenz(a,h)anthracene), six pesticides (4,4'-DDD, 4-4'-DDE, 4-4'-DDT, dieldrin, endosulfan I, and endrin aldehyde), two PCBs(Aroclor-1254 and Aroclor-1260), and seven inorganics (aluminum, arsenic**,** barium, cadmium, chromium, iron and vanadium) exceeded one or more screening criterion in subsurface sediment.

Sediment (surface and subsurface) and surface water samples were collected from Upstream Pond during the Site 4 2009 SI field activities; however, these analytical results were used to evaluate the pond as a whole and are discussed in **Section 5**.

Step 2b—Conduct a Semiquantitative Risk Evaluation Using More Realistic Assumptions

Human Health Risk Evaluation

Exposure to surface and subsurface soil at Site 4 may result in unacceptable human health risks associated with PAHs, pesticides/PCBs, and metals, based on potential human exposure. Exposure to groundwater at Site 4 may result in unacceptable human health risks associated with PCE and arsenic, based on potential human exposure. Exposure to indoor air at Site 4 may result in unacceptable human health risks associated with PCE. However, PCE is not likely site-related since the only detection was upgradient of the site. Arsenic in groundwater is likely related to the natural conditions of the aquifer and not likely to be site-related.

Exposure to surface water in the drainage ditches at Site 4 may result in unacceptable human health risks associated with arsenic and iron, based on potential human exposure. Exposure to surface sediment in the drainage ditches at Site 4 may result in unacceptable human health risks associated with benzo(a)pyrene, arsenic, and chromium and exposure to subsurface sediment in the drainage ditches at Site 4 may result in unacceptable human health risks associated with arsenic and chromium.

Ecological Risk Evaluation

Potential unacceptable ecological risks were identified with exposure to surface soil attributable to aldrin, endrin, endrin aldehyde, endrin ketone, aluminum and mercury. Potential unacceptable ecological risks were identified with exposure to subsurface soil attributable to aldrin, endrin ketone, aluminum, and mercury. In the Site 4 drainage ditches, there are no potential unacceptable ecological risks were identified with exposure to surface and subsurface sediment; however, there are potential unacceptable ecological risks identified with exposure to pyrene and iron in surface water.

Step 3—Is Further Investigation or Action Required?

Results from test pitting activities indicate that buried debris exists at Site 4 and the vertical and horizontal extent of the debris has been sufficiently characterized during test pitting activities. However, additional site characterization for environmental media will be needed.

While the potential source area and the nature of contamination at Site 4 has been sufficiently characterized, an RI is recommended to further characterize the extent of contamination within soil, groundwater, and sediment and to further quantify the risk associated with all media. Information regarding the number of samples, sampling locations, sampling analytes, and how the sample data will be used in the RI will be agreed to by the CAX Partnering Team and documented in an RI UFP-SAP, to be submitted under separate cover. Following the RI, an FS would be prepared to evaluate remedial alternatives to mitigate potential risks to human health and ecological receptors in direct contact with debris and from potential contamination. Table 3-7 summarizes the results of the decision analysis for Site 4.

TABLE 3-1
Site 4 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**CLEAN CAX BKG SS**	**ECO Risk**	**CLEAN RSLs Residential Soil Adjusted**	**CLEAN RSLs Risk-Based SSLs**	CAS004-4HA01	CAS004-4HA02		CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SS01	CAS04-SS02	CAS04-SS03
Sample ID					CAS004-4HA01-00-1199	CAS004-4HA02-00-1199	CAS004-4HA02D-00-1199	CAS004-4HA03-00-1199	CAS004-4HA04-00-1199	CAS004-4HA05-00-1199	CAS04-SS01-1109	CAS04-SS02-1109	CAS04-SS03-1109
Sample Date					11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09
Depth					0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'
Chemical Name													
Volatile Organic Compounds (UG/KG)													
Acetone	--	--	6,100,000	4,500	5 B	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	70 B	**100**	78 B
Styrene	--	64,000	630,000	1,800	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	5 U	**2 J**	**2 J**
Toluene	--	40,000	500,000	1,600	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	5 U	6 U	6 UJ
Xylene, total	--	1,300	63,000	200	11.2 U	**2 J**	11.9 U	11.6 U	14.8 UL	14.8 R	16 U	18 U	17 UJ
Semivolatile Organic Compounds (UG/KG)													
Acenaphthene	--	LMW PAH	340,000	22,000	380 U	**330 J**	2,100 U	400 U	2,600 U	5,500 U	21 U	25 U	22 U
Anthracene	--	LMW PAH	1,700,000	360,000	380 U	**530 J**	2,100 U	400 U	2,600 U	5,500 U	**4 J**	**4.2 J**	**1.7 J**
Benzo(a)anthracene	--	HMW PAH	150	10	380 U	**1,100 J**	**290 J**	400 U	2,600 U	**1,100 J**	**16 J**	**23 J**	**14 J**
Benzo(a)pyrene	--	HMW PAH	15	3.5	380 U	**950 J**	**440 J**	400 U	2,600 U	**2,300 J**	**7.8 J**	**14 J**	**5.8 J**
Benzo(b)fluoranthene	--	HMW PAH	150	35	380 U	**1,100 J**	**320 J**	**76 J**	**330 J**	**1,700 J**	**18 J**	**29**	**16 J**
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	380 U	**650 J**	**340 J**	**61 J**	2,600 U	**1,200 J**	21 UL	**2.5 L**	22 UL
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	380 U	**770 J**	**470 J**	**53 J**	**320 J**	**1,700 J**	**3.7 J**	**6.3 J**	22 U
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100	49 B	16,000 B	3,000 B	100 B	11,000 B	5,500 U	100 U	120 U	110 U
Carbazole	--	--	--	--	380 U	**250 J**	2,100 U	400 U	2,600 U	5,500 U	**2.6 J**	**3.8 J**	22 U
Chrysene	--	HMW PAH	15,000	1,100	380 U	**1,300 J**	**520 J**	**75 J**	**410 J**	**2,200 J**	**4 J**	**8.6 J**	22 U
Dibenz(a,h)anthracene	--	HMW PAH	15	11	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	**10 J**	**13 J**	22 U
Fluoranthene	--	LMW PAH	230,000	160,000	380 U	**2,700**	**660 J**	**49 J**	**510 J**	**1,800 J**	**21**	**36**	**17 J**
Fluorene	--	LMW PAH	230,000	27,000	380 U	**250 J**	2,100 U	400 U	2,600 U	5,500 U	21 U	25 U	22 U
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	380 U	**600 J**	**250 J**	**48 J**	2,600 U	**1,300 J**	**12 K**	**18 K**	**9.8 K**
PAH (HMW)	--	18,000	--	--	1,710 U	**9,820**	**4,480**	**959**	**8,000**	**17,250**	**96**	**135**	**96.6**
PAH (LMW)	--	29,000	--	--	1,710 U	**10,410**	**8,570**	**1,649**	**10,910**	**22,450**	**104**	**136**	**93.1**
Phenanthrene	--	LMW PAH	1,700,000	360,000	380 U	**2,400**	**560 J**	400 U	2,600 U	**1,400 J**	**16 J**	**21 J**	**8.4 J**
Pyrene	--	HMW PAH	170,000	120,000	380 U	**2,300**	**800 J**	**46 J**	**440 J**	**3,000 J**	**14 J**	**21 J**	**7 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)													
4,4'-DDE	--	114	1,400	47	3.8 U	**9.6 J**	4.2 U	4 U	**43 J**	27 U	0.67 B	4.1 U	0.72 B
4,4'-DDT	--	100	1,700	67	3.8 U	**7 J**	**4.6 J**	4 U	**9.4**	**220 K**	1.3 B	4.1 U	2.2 B
Aldrin	--	3.63	29	0.65	2 U	2.1 U	2.2 U	2.1 U	2.7 U	**33 K**	1.9 UJ	2.1 U	1.9 U
alpha-Chlordane	--	11.0	1,600	13	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	1.9 UJ	2.1 U	1.9 U
Aroclor-1242	--	8,000	220	5.3	38 U	42 U	42 U	40 U	52 U	**1,000 K**	20 U	22 U	20 U
Aroclor-1260	--	8,000	220	24	**53**	**64 J**	**75 J**	**53 J**	**600 J**	**2,700 K**	20 U	**35**	20 U
Endosulfan II	--	6.32	37,000	3,000	**4.4 J**	4.2 U	4.2 U	**5.7 J**	5.2 U	27 U	3.7 UJ	4.1 U	3.8 U
Endrin	--	1.95	1,800	440	**6.3 J**	4.2 U	4.2 U	4 U	5.2 U	**28 K**	3.7 UJ	4.1 U	**3.5 J**
Endrin aldehyde	--	1.95	1,800	440	3.8 U	4.2 U	4.2 U	4 U	5.2 U	**77 K**	3.7 UJ	4.1 U	**1.9 J**
Endrin ketone	--	1.95	1,800	440	3.8 U	4.2 U	**4.5**	4 U	5.2 U	**87 K**	3.7 UJ	4.1 U	3.8 U
gamma-Chlordane	--	11.0	1,600	13	2 U	2.1 U	2.2 U	2.1 U	2.7 U	**15 K**	1.9 UJ	2.1 U	1.9 U
Explosives (UG/KG)													
No Detections					NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)													
Aluminum	12,200	pH < 5.5	7,700	55,000	**4,560 L**	**5,810 L**	**7,160 L**	**6,760 L**	**9,560 L**	**6,260 L**	**6,360**	**29,400**	**4,560**
Antimony	11	78.0	3.1	0.66	0.49 U	0.46 U	0.55 U	0.47 U	**0.67 J**	12.6 B	**0.08 L**	**0.2 L**	**0.09 L**
Arsenic	6.36	18.0	0.39	0.0013	**2.9 L**	**2.7 L**	**2.6 L**	**3 L**	**4.1 L**	**3.5 L**	**1.6**	**6.4**	**1.4**
Barium	52.9	330	1,500	300	**20.3 J**	**36.6 J**	**27.1 J**	**25.5 J**	**164**	**68**	**17.6**	**32.1**	**14.8**
Beryllium	0.587	40.0	16	58	0.33 B	0.64 B	0.36 B	0.35 B	0.68 B	0.65 B	**0.24 J**	**0.76**	**0.22 J**
Cadmium	1.5	32.0	7	1.4	0.08 U	0.07 U	0.08 U	0.07 U	**0.74 J**	**3.3**	0.91 U	1.2 U	0.98 U
Calcium	2,290	--	--	--	**3,750**	**1,440**	**1,110 J**	**8,420**	**7,320**	**6,670**	**267**	**137**	**637**
Chromium	18.2	64.0	0.29	8.30E-04	**9.4**	**8.7**	**9.6**	**11.8**	**16.9**	**19**	**9.2 K**	**45.2 K**	**7.3 K**
Cobalt	9.93	13.0	2.3	0.49	1.4 U	**2.8 J**	**3.7 J**	**1.7 J**	**4.1 J**	**4.6 J**	**1.2**	**3.5**	**1.1**
Copper	4.25	70.0	310	51	4.5 B	**10.5**	**12**	3.8 B	**26**	**150**	**1.8 K**	**4.4 K**	**2.4 K**
Cyanide	--	15.8	160	7.4	0.02 UL	**0.12 L**	**0.13 L**	0.02 UL	0.03 UL	**0.11 L**	0.77 U	0.84 U	0.7 U
Iron	19,900	5 < pH > 8	5,500	640	**8,900 L**	**9,840 L**	**8,570 L**	**8,910 L**	**14,600 L**	**14,300 L**	**7,090**	**28,300**	**6,210**
Lead	17.4	120	400	--	**12.8**	**22.7**	**24**	**11.6**	**39.5**	**129**	**7.9 K**	**12.6 K**	**11.7 K**
Magnesium	1,070	--	--	--	**619 J**	**514 J**	**669 J**	**800 J**	**1,110 J**	**2,010**	**480 K**	**2,280 K**	**351 K**
Manganese	324	220	180	57	**48.7**	**233**	**127**	**43.2**	**151**	**175**	**27.7 K**	**33.6 K**	**28.8 K**
Mercury	0.111	0.10	2.3	0.57	**0.04 J**	**0.31**	**0.36**	**0.09 J**	**0.76**	**0.88**	**0.01 J**	**0.03 J**	**0.02 J**

TABLE 3-1
Site 4 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS004-4HA01	CAS004-4HA02		CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SS01	CAS04-SS02	CAS04-SS03
Sample ID					CAS004-4HA01-00-1199	CAS004-4HA02-00-1199	CAS004-4HA02D-00-1199	CAS004-4HA03-00-1199	CAS004-4HA04-00-1199	CAS004-4HA05-00-1199	CAS04-SS01-1109	CAS04-SS02-1109	CAS04-SS03-1109
Sample Date					11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09
Depth					0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'
Chemical Name													
Total Metals (MG/KG)													
Nickel	9.52	38.0	150	48	2.2 B	3.8 B	4.1 B	4 B	**10.1 J**	**12.1**	**2.3 J**	**8.1 J**	**2.2 J**
Potassium	708	--	--	--	**789 J**	283 B	**366 J**	**928 J**	**798 J**	**1,420**	**406 K**	**2,580 K**	**280 K**
Selenium	0.51	0.52	39	0.95	0.67 U	0.63 U	0.75 U	0.64 U	**1 J**	0.81 U	**0.22 J**	**0.27 J**	**0.18 J**
Sodium	521	--	--	--	24.4 B	23.1 B	22.6 B	72.9 B	73.8 B	60.5 B	**18.4 K**	**49.6 K**	**14.4 K**
Vanadium	27.9	130	39	180	**13.9**	**13.9**	**15.1**	**16.6**	**22.2**	**23.5**	**13.3**	**63.6**	**11.9**
Zinc	26.5	120	2,300	680	28.6 B	**106**	**102**	32.5 B	**273**	**324**	**13 K**	**28.8 K**	**10.4 K**
Wet Chemistry													
pH (ph)	--	--	--	--	NA	NA	NA	NA	NA	NA	**5**	**6**	**5.2**
Total organic carbon (TOC) (ug/g)	--	--	--	--	NA	NA	NA	NA	NA	NA	**5,600**	**16,000**	**17,000**
Grain Size (PCT/P)													
GS07 Sieve 1" (25.0 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA	**100**	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA	**100**	**100**	**100**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA	**100**	**100**	**100**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA	**100**	**100**	**100**
Sieve No. 004 (4.75 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA	**100**	**100**	**100**
Sieve No. 010 (2.00 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA	**100**	**99**	**100**
Sieve No. 020 (850 um)	--	--	--	--	NA	NA	NA	NA	NA	NA	**99**	**99**	**99**
Sieve No. 040 (425 um)	--	--	--	--	NA	NA	NA	NA	NA	NA	**95**	**95**	**95**
Sieve No. 060 (250 um)	--	--	--	--	NA	NA	NA	NA	NA	NA	**74**	**70**	**77**
Sieve No. 100 (150 um)	--	--	--	--	NA	NA	NA	NA	NA	NA	**45**	**41**	**48**
Sieve No. 200 (75 um)	--	--	--	--	NA	NA	NA	NA	NA	NA	**30**	**30**	**31**

Notes:

Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeds BKG, ECO, RSL & SSL

Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 3-1
Site 4 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS04-SS04	CAS04-SS05
Sample ID					CAS04-SS04-1109	CAS04-SS05-1109
Sample Date					11/03/09	11/03/09
Depth					0-0.5'	0-0.5'
Chemical Name						
Volatile Organic Compounds (UG/KG)						
Acetone	--	--	6,100,000	4,500	**94 J**	**120 J**
Styrene	--	64,000	630,000	1,800	6 UJ	6 UJ
Toluene	--	40,000	500,000	1,600	**2 J**	6 UJ
Xylene, total	--	1,300	63,000	200	18 UJ	18 UJ
Semivolatile Organic Compounds (UG/KG)						
Acenaphthene	--	LMW PAH	340,000	22,000	22 U	23 U
Anthracene	--	LMW PAH	1,700,000	360,000	**2.4 J**	**1.8 J**
Benzo(a)anthracene	--	HMW PAH	150	10	**16 J**	**10 J**
Benzo(a)pyrene	--	HMW PAH	15	3.5	**10 J**	**4.4 J**
Benzo(b)fluoranthene	--	HMW PAH	150	35	**20 J**	**10 J**
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	22 UL	23 UL
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	**5.5 J**	23 U
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100	110 U	**66 J**
Carbazole	--	--	--	--	**3.6 J**	**2.1 J**
Chrysene	--	HMW PAH	15,000	1,100	**7.7 J**	23 U
Dibenz(a,h)anthracene	--	HMW PAH	15	11	22 U	23 U
Fluoranthene	--	LMW PAH	230,000	160,000	**29**	**14 J**
Fluorene	--	LMW PAH	230,000	27,000	22 U	23 U
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	**20 J**	23 U
PAH (HMW)	--	18,000	--	--	**118**	**88.8**
PAH (LMW)	--	29,000	--	--	**112**	**92.5**
Phenanthrene	--	LMW PAH	1,700,000	360,000	**15 J**	**7.7 J**
Pyrene	--	HMW PAH	170,000	120,000	**17 J**	**6.9 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)						
4,4'-DDE	--	114	1,400	47	**1.2 L**	**0.9 L**
4,4'-DDT	--	100	1,700	67	3.5 U	**1.7 J**
Aldrin	--	3.63	29	0.65	1.8 U	1.9 U
alpha-Chlordane	--	11.0	1,600	13	**0.54 J**	1.9 U
Aroclor-1242	--	8,000	220	5.3	19 U	20 U
Aroclor-1260	--	8,000	220	24	**33**	**19 J**
Endosulfan II	--	6.32	37,000	3,000	3.5 U	3.7 U
Endrin	--	1.95	1,800	440	3.5 U	3.7 U
Endrin aldehyde	--	1.95	1,800	440	**2.1 J**	**1 J**
Endrin ketone	--	1.95	1,800	440	3.5 U	3.7 U
gamma-Chlordane	--	11.0	1,600	13	1.8 U	1.9 U
Explosives (UG/KG)						
No Detections					NA	NA
Total Metals (MG/KG)						
Aluminum	12,200	pH < 5.5	7,700	55,000	**5,990**	**18,000**
Antimony	11	78.0	3.1	0.66	**0.08 L**	**0.14 L**
Arsenic	6.36	18.0	0.39	0.0013	**1.1**	**3.6**
Barium	52.9	330	1,500	300	**24.8 J**	**22.2 J**
Beryllium	0.587	40.0	16	58	**0.46 J**	**0.42**
Cadmium	1.5	32.0	7	1.4	0.96 U	0.77 U
Calcium	2,290	--	--	--	**345 J**	**238 J**
Chromium	18.2	64.0	0.29	8.30E-04	**6.9**	**26.6**
Cobalt	9.93	13.0	2.3	0.49	**2.1**	**2.3**
Copper	4.25	70.0	310	51	**2.5**	**3.1**
Cyanide	--	15.8	160	7.4	0.77 U	0.77 U
Iron	19,900	5 < pH > 8	5,500	640	**4,370 J**	**15,000 J**
Lead	17.4	120	400	--	**10**	**23.7**
Magnesium	1,070	--	--	--	**454 J**	**1,200 J**
Manganese	324	220	180	57	**59 J**	**24.7 J**
Mercury	0.111	0.10	2.3	0.57	**0.03 J**	**0.03 J**

TABLE 3-1
Site 4 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS04-SS04	CAS04-SS05
Sample ID					CAS04-SS04-1109	CAS04-SS05-1109
Sample Date					11/03/09	11/03/09
Depth					0-0.5'	0-0.5'
Chemical Name						
Total Metals (MG/KG)						
Nickel	9.52	38.0	150	48	**3.1 J**	**5.6**
Potassium	708	--	--	--	**307 K**	**1,210 K**
Selenium	0.51	0.52	39	0.95	**0.28 J**	**0.32 J**
Sodium	521	--	--	--	**15.5 K**	**35.6 K**
Vanadium	27.9	130	39	180	**9.8**	**41.7**
Zinc	26.5	120	2,300	680	**14.9**	**20.3**
Wet Chemistry						
pH (ph)	--	--	--	--	**5.5**	**4.6**
Total organic carbon (TOC) (ug/g)	--	--	--	--	**17,000**	**18,000**
Grain Size (PCT/P)						
GS07 Sieve 1" (25.0 mm)	--	--	--	--	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	**100**	**100**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	**100**	**100**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	**100**	**100**
Sieve No. 004 (4.75 mm)	--	--	--	--	**100**	**100**
Sieve No. 010 (2.00 mm)	--	--	--	--	**100**	**100**
Sieve No. 020 (850 um)	--	--	--	--	**99**	**99**
Sieve No. 040 (425 um)	--	--	--	--	**94**	**96**
Sieve No. 060 (250 um)	--	--	--	--	**73**	**80**
Sieve No. 100 (150 um)	--	--	--	--	**45**	**52**
Sieve No. 200 (75 um)	--	--	--	--	**29**	**37**

Notes:
Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeds BKG, ECO, RSL & SSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 3-2
Site 4 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS004-4HA02	CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SB01	CAS04-SB02	CAS04-SB03	CAS04-SB04	CAS04-SB05
Sample ID					CAS004-4-HA02-02-1199	CAS004-4-HA03-02-1199	CAS004-4-HA04-01-1199	CAS004-4-HA05-01-1199	CAS04-SB01-1109	CAS04-SB02-1109	CAS04-SB03-1109	CAS04-SB04-1109	CAS04-SB05-1109
Sample Date					11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Depth					1-2'	1-2'	0.5-1'	0.5-1'	0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'
Chemical Name													
Volatile Organic Compounds (UG/KG)													
2-Butanone	--	--	2,800,000	1,500	**8 J**	14.2 U	20.4 U	13.0 U	28 UJ	27 UJ	27 UJ	27 UJ	28 U
Acetone	--	--	6,100,000	4,500	43 B	14.2 U	20.4 U	13.0 U	74 B	46 B	76 B	**120 J**	**98**
Chloroform	--	1,844	290	0.053	13.7 U	14.2 U	20.4 U	13.0 U	7 UJ	6 UJ	6 UJ	**1 J**	7 U
Ethylbenzene	--	1,815	5,400	1.7	**2 J**	14.2 U	20.4 U	13.0 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Methylene chloride	--	1,250	11,000	1.2	7 B	17 B	13 B	12 B	28 UJ	27 UJ	27 UJ	**12 J**	28 U
Tetrachloroethene	--	179	550	0.049	13.7 U	**3 J**	20.4 U	13.0 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Toluene	--	40,000	500,000	1,600	13.7 U	14.2 U	20.4 U	13.0 U	6 UJ	5 UJ	5 UJ	**2 J**	6 U
Semivolatile Organic Compounds (UG/KG)													
Benzo(a)anthracene	--	HMW PAH	150	10	**77 J**	11,000 UJ	17,000 UJ	4,300 U	**8.5 J**	**7.3 J**	**6.2 J**	21 U	**6.2 J**
Benzo(a)pyrene	--	HMW PAH	15	3.5	**110 J**	11,000 UJ	17,000 UJ	**550 J**	23 U	20 U	23 U	21 U	23 U
Benzo(b)fluoranthene	--	HMW PAH	150	35	**130 J**	11,000 UJ	17,000 UJ	**510 J**	23 U	20 U	23 U	21 U	23 U
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	**79 J**	11,000 UJ	17,000 UJ	4,300 U	23 UL	20 UL	23 UL	21 UL	23 UL
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	**64 J**	11,000 UJ	17,000 UJ	**490 J**	23 U	20 U	23 U	21 U	23 U
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100	670 B	**63,000 J**	2,600 B	4,300 U	110 U	100 U	120 U	110 U	120 U
Chrysene	--	HMW PAH	15,000	1,100	**130 J**	11,000 UJ	17,000 UJ	4,300 U	23 U	20 U	23 U	21 U	23 U
Di-n-butylphthalate	--	40,000	610,000	9,200	66 B	5,700 B	**90,000 J**	4,300 U	110 U	100 U	120 U	110 U	120 U
Fluoranthene	--	LMW PAH	230,000	160,000	**160 J**	11,000 UJ	17,000 UJ	**880 J**	23 U	20 U	23 U	21 U	23 U
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	**66 J**	11,000 UJ	17,000 UJ	4,300 U	23 U	20 U	23 U	21 U	23 U
PAH (HMW)	--	18,000	--	--	**1,106**	49,500 U	76,500 U	**13,230**	**101**	**87.3**	**98.2**	94.5 U	**98.2**
PAH (LMW)	--	29,000	--	--	**1,940**	49,500 U	76,500 U	**18,080**	104 U	90 U	104 U	94.5 U	104 U
Phenanthrene	--	LMW PAH	1,700,000	360,000	**100 J**	11,000 UJ	17,000 UJ	4,300 U	23 U	20 U	23 U	21 U	23 U
Pyrene	--	HMW PAH	170,000	120,000	**210 J**	11,000 UJ	17,000 UJ	**930 J**	23 U	20 U	23 U	21 U	23 U
Pesticide/Polychlorinated Biphenyls (UG/KG)													
4,4'-DDD	--	583	2,000	66	**4.5 L**	4.6 U	6.7 U	4.3 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
4,4'-DDE	--	114	1,400	47	**5.3 P**	4.6 U	**24 J**	**10 J**	3.6 UJ	3.3 U	3.8 UL	3.3 UJ	3.4 UJ
4,4'-DDT	--	100	1,700	67	**5.8 P**	4.6 U	**13 J**	**150 L**	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Aldrin	--	3.63	29	0.65	2.5 UL	2.4 U	3.4 U	**27 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
alpha-Chlordane	--	11.0	1,600	13	2.5 UL	2.4 U	3.4 U	**2.4 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Aroclor-1242	--	8,000	220	5.3	48 UL	46 U	67 U	**2,300 L**	20 U	18 U	21 U	18 U	18 U
Aroclor-1260	--	8,000	220	24	48 UL	**51 K**	**330 J**	**1,600 L**	20 U	18 U	21 U	18 U	18 U
Endosulfan II	--	6.32	37,000	3,000	4.8 UL	**6.5 K**	6.7 U	4.3 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Endrin ketone	--	1.95	1,800	440	4.8 UL	4.6 U	**8.9 J**	**19 J**	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
gamma-Chlordane	--	11.0	1,600	13	2.5 UL	2.4 U	3.4 U	**4.3 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Heptachlor	--	52.9	110	1.2	2.5 UL	2.4 U	3.4 U	**9.9 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Methoxychlor	--	500	31,000	9,900	25 UL	24 U	34 U	**25 J**	19 UJ	17 U	20 U	17 UJ	18 UJ
Explosives (UG/KG)													
No Detections					NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)													
Aluminum	13,000	pH < 5.5	7,700	55,000	**3,670 L**	**9,660 L**	**7,520 L**	**5,850 L**	**29,400**	**5,310**	**22,800**	**6,400**	**20,700**
Antimony	--	78.0	3.1	0.66	0.53 U	0.53 U	0.69 U	1.1 B	**0.15 L**	**0.04 L**	**0.12 L**	**0.05 L**	**0.12 L**
Arsenic	5.54	18.0	0.39	0.0013	**1.8 L**	**2.9 L**	**3.9 L**	**3.7 L**	**6.9**	**0.62**	**4.8**	**0.89**	**5.7**
Barium	84.5	330	1,500	300	**20.2 J**	**48 J**	**247**	**30.6 J**	**42.8**	**28.6**	**32 J**	**25.8 J**	**22 J**
Beryllium	0.52	40.0	16	58	0.31 B	0.39 B	0.4 B	0.55 B	**0.49 J**	**0.35 J**	**0.48**	**0.53**	**0.57**
Cadmium	--	32.0	7	1.4	0.08 U	0.08 U	**0.96 J**	**1.2 J**	2.2 U	0.73 U	0.94 U	0.86 U	**0.07 J**
Calcium	2,380	--	--	--	**478 J**	**4,060**	**5,970**	**3,240**	**744**	**300**	**278 J**	**183 J**	**108 J**
Chromium	33.7	64.0	0.29	8.30E-04	**6.9**	**15.9**	**13.4**	**17.4**	**39.6 K**	**6.1 K**	**32**	**7.3**	**33.4**
Cobalt	5.18	13.0	2.3	0.49	**1.6 J**	**4.3 J**	**3.8 J**	**2.8 J**	**3.9**	**1.8**	**3.4**	**2.6**	**2.8**
Copper	3.17	70.0	310	51	4.4 B	**40.4**	**30**	**30.1**	**2.9 K**	**2.8 K**	**2.7**	2 B	**3.4**
Cyanide	2.7	15.8	160	7.4	0.03 UL	0.03 UL	**0.44 L**	0.03 UL	0.84 U	0.77 U	0.77 U	0.77 U	0.77 U
Iron	32,000	5 < pH > 8	5,500	640	**4,960 L**	**19,300 L**	**12,100 L**	**12,700 L**	**31,600**	**3,830**	**20,900 J**	**4,300 J**	**21,800 J**
Lead	8.79	120	400	--	**11.3**	**45.3**	**42.3**	**36.2**	**11 K**	**4.4 K**	**9.7**	**5.1**	**10.7**
Magnesium	1,120	--	--	--	**327 J**	**499 J**	**812 J**	**1,310 J**	**1,600 K**	**400 K**	**1,230 J**	**478 J**	**1,670 J**
Manganese	176	220	180	57	**28.3**	**120**	**105**	**40.4**	**32.7 K**	**72.8 K**	**28 J**	**47.2 J**	**22.7 J**
Mercury	0.14	0.10	2.3	0.57	**0.1 J**	**0.91**	**0.9**	**0.44**	**0.05**	0.03 U	**0.04**	**0.01 J**	**0.01 J**
Nickel	17.6	38.0	150	48	3.5 B	**17.3**	**13.6**	7.7 B	**8 J**	**2.8 J**	**6.7**	**3.6**	**5.8**

TABLE 3-2
Site 4 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS004-4HA02	CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SB01	CAS04-SB02	CAS04-SB03	CAS04-SB04	CAS04-SB05
Sample ID					CAS004-4-HA02-02-1199	CAS004-4-HA03-02-1199	CAS004-4-HA04-01-1199	CAS004-4-HA05-01-1199	CAS04-SB01-1109	CAS04-SB02-1109	CAS04-SB03-1109	CAS04-SB04-1109	CAS04-SB05-1109
Sample Date					11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Depth					1-2'	1-2'	0.5-1'	0.5-1'	0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'
Chemical Name													
Potassium	901	--	--	--	249 B	**566 J**	**531 J**	**1,700**	**1,050 K**	**305 K**	**944 K**	**319 K**	**1,910 K**
Total Metals (MG/KG)													
Selenium	0.64	0.52	39	0.95	**0.78 J**	0.72 U	0.94 U	0.79 U	**0.51 J**	**0.2 J**	**0.45 J**	**0.3 J**	**0.26 J**
Sodium	811	--	--	--	11.6 B	37.4 B	57.1 B	48.7 B	**54.8 K**	**21.1 K**	**31.4 K**	**15.8 K**	**31.4 K**
Thallium	--	1.00	--	--	0.58 UL	0.58 UL	0.75 UL	0.63 UL	**0.33**	0.07 B	0.23 B	0.08 B	0.16 B
Vanadium	48.3	130	39	180	10.1 B	**12.2**	**17.1**	**20.5**	**57.7**	**7.8**	**53.7**	**8.4**	**51.8**
Zinc	28	120	2,300	680	28.6 B	**334**	**373**	**150**	**28.2 K**	**7.8 K**	**22.6**	**11.5**	**22.2**
Wet Chemistry													
pH (ph)	--	--	--	--	NA	NA	NA	NA	**5**	**5.8**	**4.7**	**5**	**4.4**
Total organic carbon (TOC) (ug/g)	--	--	--	--	NA	NA	NA	NA	**4,800**	**3,400**	**6,100**	**5,400**	**3,400**
Grain Size (PCT/P)													
GS07 Sieve 1" (25.0 mm)	--	--	--	--	NA	NA	NA	NA	**100**	**100**	**100**	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	NA	NA	NA	NA	**100**	**100**	**100**	**100**	**100**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	NA	NA	NA	NA	**100**	**100**	**100**	**100**	**100**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	NA	NA	NA	NA	**100**	**100**	**100**	**100**	**100**
Sieve No. 004 (4.75 mm)	--	--	--	--	NA	NA	NA	NA	**100**	**100**	**100**	**100**	**100**
Sieve No. 010 (2.00 mm)	--	--	--	--	NA	NA	NA	NA	**100**	**100**	**100**	**100**	**100**
Sieve No. 020 (850 um)	--	--	--	--	NA	NA	NA	NA	**99**	**99**	**100**	**99**	**100**
Sieve No. 040 (425 um)	--	--	--	--	NA	NA	NA	NA	**95**	**95**	**97**	**95**	**98**
Sieve No. 060 (250 um)	--	--	--	--	NA	NA	NA	NA	**77**	**66**	**83**	**73**	**79**
Sieve No. 100 (150 um)	--	--	--	--	NA	NA	NA	NA	**56**	**36**	**62**	**41**	**50**
Sieve No. 200 (75 um)	--	--	--	--	NA	NA	NA	NA	**45**	**27**	**53**	**27**	**33**

Notes:
- Exceeds Background
- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 3-3
Site 4 Groundwater Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG GW YE AQUIFER	CLEAN MCL-Groundwater	CLEAN RSLs Tapwater Adjusted	CAS04-GW01	CAS04-GW02	CAS04-GW03	CAS04-GW04	
Sample ID				CAS04-GW01-1009	CAS04-GW02-1009	CAS04-GW03-1009	CAS04-GW04-1009	CAS04-GW04P-1009
Sample Date				10/30/09	10/30/09	10/30/09	10/30/09	10/30/09
Chemical Name								
Volatile Organic Compounds (UG/L)								
Tetrachloroethene	--	5	0.11	3 U	3 U	3 U	**1 J**	**1 J**
Trichloroethene	--	5	2	1 U	1 U	**0.4 J**	1 U	1 U
Semivolatile Organic Compounds (UG/L)								
No Detections				NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections				NA	NA	NA	NA	NA
Total Metals (UG/L)								
Aluminum	2,230	--	3,700	78.6 B	**2,700**	**206 J**	50.9 B	60.5 B
Antimony	18.8	6	1.5	**0.17 J**	**0.4 J**	**0.37 J**	1 U	1 U
Arsenic	2.28	10	0.045	5 U	**7.4**	**1.8 J**	5 U	5 U
Barium	118	2,000	730	**18.6**	**25.7**	**12.1**	**20.6**	**23.3**
Beryllium	2.45	4	7.3	1 U	**0.16 J**	1 U	1 U	1 U
Cadmium	0.605	5	1.8	1 U	**0.29 J**	**0.07 J**	**0.05 J**	**0.06 J**
Calcium	169,000	--	--	**126,000**	**129,000**	**83,200**	**132,000**	**147,000**
Chromium	15.1	100	0.043	**0.77 J**	**9.8 J**	**1.2 J**	15 U	**0.44 J**
Cobalt	20.6	--	1.1	**0.58 J**	**1.3 J**	30 U	**0.88 J**	**1 J**
Copper	12.2	1,300	150	25 U	1.4 B	25 U	**5.1 J**	1.5 B
Iron	894	--	2,600	**387**	**5,010**	**296**	9.7 B	10.5 B
Lead	21.3	15	15	5 U	**3 J**	5 U	5 U	**1.2 J**
Magnesium	11,500	--	--	**2,070**	**2,360**	**946**	**1,880**	**2,080**
Manganese	57.9	--	88	**179**	**48**	**26.9**	**41.9**	**45.2**
Nickel	11.4	--	73	**1.7 J**	**3.5 J**	**0.69 J**	**1.3 J**	**1.2 J**
Potassium	12,700	--	--	**993 J**	**1,220**	**424 J**	**3,090**	**3,370**
Sodium	64,500	--	--	**8,890**	**7,520**	**2,310**	**8,230**	**9,030**
Vanadium	26.2	--	18	25 U	**11.1 J**	25 U	25 U	25 U
Zinc	4.52	--	1,100	25 U	**9 J**	**4 J**	**7.2 J**	**2.9 J**
Dissolved Metals (UG/L)								
Aluminum, Dissolved	100	--	3,700	44.4 B	**395**	64.4 B	52.4 B	32.2 B
Antimony, Dissolved	9.7	6	1.5	**0.18 J**	**0.22 J**	**0.26 J**	**0.16 J**	1 U
Arsenic, Dissolved	1.37	10	0.045	**1.6 J**	**1.8 J**	**1.9 J**	**2 J**	**1.7 J**
Barium, Dissolved	127	2,000	730	**19.4**	**19.4**	**11.6**	**21.2**	**20.2**
Cadmium, Dissolved	0.177	5	1.8	1 U	**0.11 J**	1 U	**0.06 J**	**0.07 J**
Calcium, Dissolved	113,000	--	--	**131,000**	**126,000**	**80,700**	**136,000**	**131,000**
Chromium, Dissolved	6.04	100	0.043	15 U	**1.6 J**	15 U	15 U	15 U
Cobalt, Dissolved	0.7	--	1.1	**0.7 J**	**0.56 J**	30 U	**0.87 J**	**0.8 J**
Iron, Dissolved	275	--	2,600	**299**	**840**	38.8 B	100 U	100 U
Lead, Dissolved	1.7	15	15	5 U	5 U	**1 J**	5 U	5 U
Magnesium, Dissolved	11,200	--	--	**2,160**	**1,950**	**905**	**1,920**	**1,840**
Manganese, Dissolved	49.5	--	88	**184**	**41.8**	**24.7**	**41.6**	**42**
Nickel, Dissolved	12.2	--	73	**2 J**	**1 J**	**0.29 J**	**1.2 J**	**1.1 J**
Potassium, Dissolved	12,600	--	--	**1,080**	**776 J**	**380 J**	**3,180**	**3,060**
Sodium, Dissolved	62,800	--	--	**9,230**	**7,450**	**2,280**	**8,440**	**7,970**
Zinc, Dissolved	--	--	1,100	**4.2 J**	**3.5 J**	**2.2 J**	25 U	**2.2 J**

Notes:
Exceeds Background
Exceeds BKG & MCL
Exceeds BKG & RSL
Exceeds BKG, MCL & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
R - Unreliable Result
U - The material was analyzed for, but not detected
UL - Analyte not detected, quantitation limit is probably higher
UG/L - Micrograms per liter

Table 3-4
Site 4 Surface Water Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Tapwater X 10	CAS04-SW05	CAS04-SW06	CAS04-SW07		CAS04-SW08	CAS04-SW09
Sample ID			CAS04-SW05-1209	CAS04-SW06-1209	CAS04-SW07-1209	CAS04-SW07P-1209	CAS04-SW08-1209	CAS04-SW09-1209
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name								
Volatile Organic Compounds (UG/L)								
No Detections			NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/L)								
Benzo(k)fluoranthene	9.07	2.9	0.069 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
bis(2-Ethylhexyl)phthalate	32.0	48	0.94 U	0.96 U	0.96 U	1.5	1.5	0.48 J
Fluoranthene	8.10	1,500	0.18 J	0.19 U	0.19 U	0.19 U	0.19 U	0.11 J
Phenanthrene	6.30	11,000	0.088 J	0.19 U	0.19 U	0.19 U	0.19 U	0.069 J
Pyrene	0.025	1,100	0.29 J	0.19 U	0.19 U	0.065 J	0.19 U	0.23 J
Pesticide/Polychlorinated Biphenyls (UG/L)								
No Detections			NA	NA	NA	NA	NA	NA
Total Metals (UG/L)								
Aluminum	87.0	37,000	83.1 J	300 U	248 J	1,120	215 J	518
Arsenic	150	0.45	1.6 B	5 U	5 U	5 U	5 U	58
Barium	4.00	7,300	25.6	26.2	26.5	30.3	26.3	42.5
Beryllium	0.66	73	1 U	1 U	1 U	0.06 J	1 U	1 U
Cadmium	0.52	18	1 U	0.16 J	0.3 J	0.45 J	0.28 J	1 U
Calcium	--	--	132,000	129,000	131,000	132,000	125,000	114,000
Cobalt	23.0	11	0.29 J	0.4 J	0.66 J	1.1	0.63 J	0.61 J
Copper	20.0	1,500	1.3	1.4	2.3	7	3.4	1.6
Iron	1,000	26,000	682	339	353	1,800	424	30,300
Lead	9.90	150	0.36 B	0.18 B	0.67 J	2.6	1.2	1.5
Magnesium	--	--	2,200	2,040	2,000	2,160	2,000	2,660
Manganese	120	880	72.8	19.8	6.6	12.5	11.8	250
Nickel	110.9	730	0.65 B	1.1 B	1.4 B	2 J	1.5 B	0.6 B
Potassium	--	--	1,380 B	1,680	2,010	2,230	2,180	1,440 B
Selenium	5.00	180	0.82 J	1.3 J	1.3 J	1.1 J	1.2 J	5 U
Sodium	--	--	7,140	7,860	8,260	8,140	8,180	5,480
Vanadium	20.0	180	0.72 B	1 B	1.3 B	4.6 J	1.8 B	2.1 B
Zinc	255	11,000	3.2 B	12.6 J	16.8 J	31.4	18.2 J	16.5 J
Dissolved Metals (UG/L)								
Arsenic, Dissolved	150	0.45	5 U	5 U	5 U	5 U	5 U	16.6
Barium, Dissolved	4.00	7,300	23.8	24.3	24.4	25.4	23.9	23.8
Cadmium, Dissolved	0.46	18	1 U	0.14 J	0.18 J	0.18 J	0.19 J	1 U
Calcium, Dissolved	--	--	128,000	128,000	120,000	128,000	122,000	114,000
Cobalt, Dissolved	23.0	11	0.2 J	0.53 J	0.43 J	0.49 J	0.56 J	0.67 J
Iron, Dissolved	1,000	26,000	8.7 B	5.2 B	13.3 B	100 U	7.9 B	5,680
Magnesium, Dissolved	--	--	2,150	2,030	1,780	1,910	1,860	3,110
Manganese, Dissolved	120	880	49.6	18.8	4.4 J	5.3	6.2	268
Potassium, Dissolved	--	--	1,320 B	1,680	1,850	1,930	2,150	1,380 B
Selenium, Dissolved	4.61	180	5 U	5 U	5 U	0.84 J	1.6 J	5 U
Sodium, Dissolved	--	--	7,120	7,840	7,410	8,030	8,020	5,550
Vanadium, Dissolved	20.0	180	5 U	5 U	1.2 J	1.2 J	1.1 J	5 U
Zinc, Dissolved	252	11,000	5.2 B	11.9 B	14.8 B	16 B	12.8 B	19.8 J

Table 3-4
Site 4 Surface Water Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**ECO Risk**	**CLEAN RSLs Tapwater X 10**	CAS04-SW05	CAS04-SW06	CAS04-SW07		CAS04-SW08	CAS04-SW09
Sample ID			CAS04-SW05-1209	CAS04-SW06-1209	CAS04-SW07-1209	CAS04-SW07P-1209	CAS04-SW08-1209	CAS04-SW09-1209
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name								
Wet Chemistry								
Hardness (ug/l)	--	--	**338,000**	**330,000**	**335,000**	NA	**321,000**	**297,000**

Notes:

Exceeds ECO

Exceeds RSL

Exceeds ECO & RSL

Bold indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in blanks

J - Analyte present, value may or may not be accurate or precise

L - Analyte present, value may be biased low, actual value may be higher

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UL - Analyte not detected, quantitation limit is probably higher

UG/L - Micrograms per liter

TABLE 3-5
Site 4 Surface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil X 10	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209A	CAS04-SD06-1209A	CAS04-SD07-1209A	CAS04-SD07P-1209A	CAS04-SD08-1209A	CAS04-SD09-1209A
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Depth			0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Chemical Name								
Volatile Organic Compounds (UG/KG)								
2-Butanone	1,331	28,000,000	**51 J**	**25 J**	29 U	33 U	34 UJ	**44 J**
Acetone	--	61,000,000	**230 J**	**120 J**	24 B	34 B	42 B	**170 J**
Carbon disulfide	4.19	820,000	**2 J**	7 UJ	6 U	6 U	7 UJ	8 UJ
Tetrachloroethene	2,613	5,500	**14 J**	**8 J**	6 U	**5 J**	**4 J**	**15 J**
Semivolatile Organic Compounds (UG/KG)								
Acenaphthene	290	3,400,000	**12 J**	29 U	25 U	27 U	26 U	**3.2 J**
Acenaphthylene	160	3,400,000	**30 J**	29 U	25 U	27 U	26 U	**5.4 J**
Anthracene	57.2	17,000,000	**55**	29 U	25 U	27 U	26 U	**2.3 J**
Benzo(a)anthracene	108	1,500	**420**	28 B	7.3 B	7.4 B	14 B	**53**
Benzo(a)pyrene	150	150	**380**	**18 J**	25 U	27 U	**9 J**	**54**
Benzo(b)fluoranthene	240	1,500	**690**	40 B	25 U	27 U	26 U	**82**
Benzo(g,h,i)perylene	170	1,700,000	**130 L**	**10 L**	25 UL	27 UL	26 UL	**16 L**
Benzo(k)fluoranthene	240	15,000	**150**	**11 J**	25 U	27 U	26 U	**25 J**
bis(2-Ethylhexyl)phthalate	750	19,081,600	180 U	140 U	130 U	140 U	**100 J**	160 U
Carbazole	140	--	**23 J**	**7.2 J**	**6 J**	27 U	26 U	**9 J**
Chrysene	166	150,000	**440**	**17 J**	25 U	27 U	**3.1 J**	**55**
Dibenz(a,h)anthracene	33.0	150	**120**	**16 J**	25 U	27 U	26 U	**16 J**
Fluoranthene	423	2,300,000	**820**	**41**	25 U	27 U	**22 J**	**110**
Fluorene	77.4	2,300,000	**30 J**	29 U	25 U	27 U	26 U	5.7 B
Indeno(1,2,3-cd)pyrene	200	1,500	**300**	**23 J**	25 U	27 U	**11 J**	**42**
Naphthalene	176	36,000	**6 J**	29 U	25 U	27 U	26 U	32 U
PAH (HMW)	2,900	--	**3,320**	**156**	104 U	112 U	**97.1**	**453**
PAH (LMW)	786	--	**1,329**	**156**	113 U	122 U	**123**	**246**
PAH (total)	3,553	--	**4,649**	**312**	216 U	233 U	**220**	**699**
Phenanthrene	204	17,000,000	**340**	**13 J**	25 U	27 U	**9.7 J**	**74**
Pyrene	195	1,700,000	**690**	**27 J**	25 U	27 U	**15 J**	**110**
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	4.88	20,000	**34 J**	**4.5 J**	**1.6 J**	4.3 UJ	**21 J**	**12 J**
4,4'-DDE	3.16	14,000	**9.1 J**	**1.4 J**	4.1 U	4.3 UJ	**6.7**	**13 J**
4,4'-DDT	4.16	17,000	**37 J**	**4.3 J**	4.1 U	**0.83 J**	**43 J**	**4.6 J**
Aldrin	2.00	--	3 UJ	2.4 UJ	2.1 U	2.2 UJ	**1 J**	2.7 UJ
Aroclor-1242	59.8	2,200	32 U	**52 J**	22 U	24 U	25 U	**20 J**
Aroclor-1254	59.8	1,100	**330**	24 U	21 U	22 U	24 U	27 U
Aroclor-1260	59.8	2,200	**320**	**44**	**23**	24 U	**230**	29 U
Endosulfan I	14.3	370,000	**9.4 J**	2.4 UJ	2.1 U	2.2 UJ	2.4 U	**1.3 J**
Endosulfan II	69.0	370,000	**9.4 J**	**1.1 J**	**0.64 J**	4.3 UJ	**2.9 J**	**1.5 J**
Endosulfan sulfate	26.6	370,000	5.9 UJ	**3.4 J**	4.1 U	4.3 UJ	**18 J**	5.3 UJ
Endrin aldehyde	2.22	18,000	**13 J**	4.6 UJ	4.1 U	4.3 UJ	4.6 U	5.3 UJ
gamma-BHC (Lindane)	2.37	5,200	3 UJ	**0.78 J**	2.1 U	2.2 UJ	2.4 U	2.7 UJ
gamma-Chlordane	3.24	16,000	**12 J**	**1.6 J**	2.1 U	2.2 UJ	**1.4 J**	**2 J**
Heptachlor	335	1,100	**1.7 J**	2.4 UJ	2.1 U	2.2 UJ	2.4 U	2.7 UJ
Total Metals (MG/KG)								
Aluminum	25,500	77,000	**10,100**	**5,510**	**11,400**	**11,600**	**6,550**	**7,320**
Arsenic	9.79	3.9	**4.9 L**	**2.5 L**	**3.3 L**	**3.6 L**	**5 L**	**10.4 L**

TABLE 3-5
Site 4 Surface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**ECO Risk**	**CLEAN RSLs Residential Soil X 10**	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209A	CAS04-SD06-1209A	CAS04-SD07-1209A	CAS04-SD07P-1209A	CAS04-SD08-1209A	CAS04-SD09-1209A
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Depth			0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Chemical Name								
Barium	20.0	15,000	**31.6**	**17.1**	**27.7**	**26.9**	**19.5**	**21.8**
Beryllium	--	160	**0.57 J**	**0.34 J**	**0.65**	**0.64**	**0.39 J**	**0.38 J**
Cadmium	0.99	70	**0.32**	**0.17**	**0.44**	**0.36**	**0.65**	**0.16**
Calcium	--	--	**11,500**	**9,290**	**2,250**	**2,300**	**12,400**	**2,270**
Chromium	43.4	2.9	**18.5 L**	**10.5 L**	**27.2 L**	**25.9 L**	**17.3 L**	**9.4 L**
Cobalt	50.0	23	**2.7 J**	**1.3 J**	**2.7**	**2.6 J**	**2.4 J**	**1.7 J**
Copper	31.6	3,100	**7.5 J**	**3.7 J**	**2.5 J**	**3.5 J**	**24.6 J**	**5.6 J**
Total Metals (MG/KG)								
Iron	20,000	55,000	**13,200**	**6,690**	**11,800**	**12,000**	**13,600**	**6,400**
Lead	35.8	4,000	**17.5**	**5.7**	**5.7**	**5.6**	**10.6**	**14.2**
Magnesium	--	--	**1,350**	**1,010**	**1,630**	**1,640**	**1,750**	**545**
Manganese	460	1,800	**47.4**	**20.2**	**16.5**	**20.2**	**62.2**	**21.7**
Mercury	0.18	23	**0.12**	**0.02 J**	**0.02 J**	**0.02 J**	**0.01 J**	**0.04 J**
Nickel	22.7	1,500	**6.5**	**2.9 J**	**7**	**7.4**	**6.9**	**4.6 J**
Potassium	--	--	**1,640 K**	**1,060 K**	**1,830 K**	**1,940 K**	**1,380 K**	**501 K**
Selenium	2.00	390	**0.87 J**	**0.37 J**	**0.3 J**	**0.33 J**	**0.25 J**	1.5 U
Sodium	--	--	48.1 B	106 B	29.2 B	26.8 B	**140**	29.9 B
Thallium	--	--	2 U	1.5 U	1.1 U	1.7 U	1.3 U	**0.5 J**
Vanadium	57.0	390	**23**	**12.2**	**30.4**	**30.6**	**19.5**	**15.6**
Zinc	121	23,000	**53.2**	**20.1**	**19.7**	**21.2**	**64.5**	**49.9**
Wet Chemistry								
pH (ph)	--	--	**7.4**	**8**	**8.2**	NA	**8.0**	**7.2**
Total organic carbon (TOC) (ug/g)	--	--	**36,000**	**19,000**	**2,300**	NA	**9,900**	**40,000**

Notes:
Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 3-6
Site 4 Subsurface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil X 10	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209B	CAS04-SD06-1209B	CAS04-SD07-1209B	CAS04-SD07P-1209B	CAS04-SD08-1209B	CAS04-SD09-1209B
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Depth			4-8"	4-8"	4-8"	4-8"	4-8"	4-8"
Chemical Name								
Volatile Organic Compounds (UG/KG)								
2-Butanone	1,331	28,000,000	**14 J**	**26 J**	32 U	30 U	28 U	**18 J**
Acetone	--	61,000,000	**87 J**	**130 J**	22 B	19 B	8 B	**110 K**
Carbon disulfide	4.19	820,000	7 UJ	**1 J**	6 U	6 U	6 U	7 U
Tetrachloroethene	2,613	5,500	**16 J**	**17 J**	6 U	**2 J**	**2 J**	7 U
Semivolatile Organic Compounds (UG/KG)								
Acenaphthene	290	3,400,000	**3.5 J**	30 U	25 U	26 U	24 U	27 U
Acenaphthylene	160	3,400,000	**10 J**	30 U	25 U	26 U	24 U	27 U
Anthracene	57.2	17,000,000	**11 J**	30 U	25 U	26 U	24 U	27 U
Benzo(a)anthracene	108	1,500	**130**	21 B	25 U	26 U	12 B	12 B
Benzo(a)pyrene	150	150	**130**	**9.7 J**	25 U	26 U	**6.4 J**	**6 J**
Benzo(b)fluoranthene	240	1,500	**220**	30 B	25 U	26 U	14 B	18 B
Benzo(g,h,i)perylene	170	1,700,000	**56 L**	30 UL	25 UL	26 UL	**8.6 L**	27 UL
Benzo(k)fluoranthene	240	15,000	**46**	**5.6 J**	25 U	26 U	**4.2 J**	27 U
bis(2-Ethylhexyl)phthalate	750	350,000	**100 J**	150 U	130 U	130 U	**89 J**	130 U
Carbazole	140	--	**9.6 J**	**7.5 J**	25 U	26 U	**7.3 J**	**6.5 J**
Chrysene	166	150,000	**130**	**5.5 J**	25 U	26 U	24 U	27 U
Dibenz(a,h)anthracene	33.0	150	**48**	**12 J**	25 U	26 U	**14 J**	27 U
Fluoranthene	423	2,300,000	**250**	**23 J**	25 U	26 U	**10 J**	**14 J**
Indeno(1,2,3-cd)pyrene	200	1,500	**110**	**14 J**	25 U	26 U	**12 J**	**8.1 J**
PAH (HMW)	2,900	--	**1,060**	**103**	113 U	117 U	**75.5**	**97.1**
PAH (LMW)	786	--	**424**	**136**	113 U	117 U	**99.2**	**118**
PAH (total)	3,553	--	**1,484**	**239**	225 U	234 U	**175**	**215**
Pentachlorophenol	--	6,945	150 UL	150 UL	130 UL	130 UL	**19 J**	130 UL
Phenanthrene	204	17,000,000	**100**	**7.5 J**	25 U	26 U	**5.2 J**	**9.6 J**
Pyrene	195	1,700,000	**190**	**16 J**	25 U	26 U	**5.3 J**	**14 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	4.88	20,000	**8.4 J**	5 UJ	4.3 U	4.1 UJ	**4.7 J**	**14**
4,4'-DDE	3.16	14,000	**3.3 J**	5 UJ	4.3 U	4.1 UJ	**2 J**	**5**
4,4'-DDT	4.16	17,000	**8.2 J**	5 UJ	4.3 U	4.1 UJ	**120 J**	**1.3 J**
Aroclor-1254	59.8	1,100	**63**	26 U	22 U	21 U	21 U	23 U
Aroclor-1260	59.8	2,200	**72**	28 U	23 U	22 U	**30**	24 U
Dieldrin	1.90	300	4.8 UJ	5 UJ	4.3 U	4.1 UJ	4 U	**3.3 J**
Endosulfan I	14.3	370,000	**2.7 J**	2.6 UJ	2.2 U	2.1 UJ	2.1 U	**0.63 J**
Endosulfan II	69.0	370,000	**2.2 J**	5 UJ	4.3 U	4.1 UJ	4 U	4.4 U
Endosulfan sulfate	--	74.41	4.8 UJ	5 UJ	4.3 U	4.1 UJ	**2 J**	4.4 U
Endrin aldehyde	2.22	18,000	**3.6 J**	5 UJ	4.3 U	4.1 UJ	4 U	4.4 U
gamma-Chlordane	3.24	16,000	**2.8 J**	2.6 UJ	2.2 U	2.1 UJ	2.1 U	2.3 U
Total Metals (MG/KG)								
Aluminum	25,500	77,000	**11,300**	**5,830**	**28,700 J**	**9,020 J**	**3,170**	**6,900**
Arsenic	9.79	3.9	**4.2 L**	**2.3 L**	**9 L**	**3.4 L**	**2.7 L**	**13.2 L**
Barium	20.0	15,000	**29.8**	**19.6**	**68.4 J**	**21.8 J**	**9.6**	**19.6**
Beryllium	--	160	**0.57 J**	**0.35 J**	**1.8 J**	**0.6 J**	**0.21 J**	**0.4 J**
Cadmium	0.99	70	**0.25**	**0.07 J**	**1.4 J**	**0.34 J**	**0.21**	**0.19**
Calcium	--	--	**7,550**	**4,950**	**4,670**	**1,720**	**19,800**	**2,600**
Chromium	43.4	2.9	**19.8 L**	**10.6 L**	**71.8 L**	**25.5 L**	**13.3 L**	**14.5 L**
Cobalt	50.0	23	**2.7 J**	**1.2 J**	**6.8 J**	**1.9 J**	**0.8 J**	**2.2 J**
Copper	31.6	3,100	**5.9 J**	**2.5 J**	**3 J**	**2.9 J**	**3.1 J**	**2.8 J**
Iron	20,000	55,000	**12,300**	**5,740**	**28,200 J**	**8,850 J**	**4,260**	**7,550**

TABLE 3-6
Site 4 Subsurface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil X 10	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209B	CAS04-SD06-1209B	CAS04-SD07-1209B	CAS04-SD07P-1209B	CAS04-SD08-1209B	CAS04-SD09-1209B
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Depth			4-8"	4-8"	4-8"	4-8"	4-8"	4-8"
Chemical Name								
Lead	35.8	4,000	**13.2**	**4.6**	**14.3**	**4.8**	**3.4**	**7.2**
Magnesium	--	--	**1,330**	**775**	**4,050**	**1,360**	**777**	**861**
Manganese	460	1,800	**34.4**	**15.9**	**50.4**	**17.2**	**17**	**15.9**
Mercury	0.18	2.3	**0.05**	**0.01 J**	**0.04 J**	**0.01 J**	0.04 U	**0.01 J**
Nickel	22.7	1,500	**6.3**	**2.7 J**	**20.9**	**7.2**	**2.9**	**4.9**
Potassium	--	--	**1,650 K**	**1,030 K**	**4,710 K**	**1,610 K**	**844 K**	**839 K**
Total Metals (MG/KG)								
Sodium	--	--	48 B	33.2 B	75.5 B	30.6 B	**210**	26.3 B
Selenium	2.00	390	**0.4 J**	1.1 U	2.2 U	1.1 U	**0.39 J**	0.91 U
Vanadium	57.0	390	**24.4**	**12.1**	**82**	**29**	**17.2**	**18.5**
Zinc	121	23,000	**40.9**	**11.1**	**54.1 J**	**17.4 J**	**14**	**24.6**
Wet Chemistry								
pH (ph)	--	--	**7.8**	**7.9**	**8**	NA	**8.3**	**7.5**
Total organic carbon (TOC) (ug/g)	--	--	**14,000**	**34,000**	**2,400**	NA	**2,500**	**16,000**

Notes:
Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 3-7
Site 4 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1 Site Potentially CERCLA-eligible?	Inorganics Above Background or Non-inorganics Detected?	Potentially Attributable to CERCLA Release?	Step 2a Exceedances of Comparison Criteria?	Step 2b Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3 Is further Investigation or Action Required?
Site 4 Surface Soil	Yes	VOCs	Yes	None	N/A	Yes
		SVOCs	Yes	benzo(a)anthracene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				benzo(a)pyrene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				benzo(b)fluoranthene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				benzo(k)fluoranthene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				chrysene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				dibenz(a,h)anthracene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				indeno(1,2,3-cd)pyrene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
		Pesticides	Yes	4,4'-DDT (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				aldrin (>bkg, Eco, SSL, & Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				endrin (>bkg & Eco)	exceeds acceptable Eco risk value	
				endrin aldehyde (>bkg & Eco)	exceeds acceptable Eco risk value	
				endrin ketone (> bkg & Eco)	exceeds acceptable Eco risk value	
				gamma-chlordane (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively)	
		PCBs	Yes	aroclor-1242 (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				aroclor-1260 (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
		Inorganics	Yes	aluminum (>bkg, Eco, & Res RSL)	acceptable HH risk value; exceeds acceptable Eco risk value	
				arsenic (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				cadmium (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				chromium (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				copper (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				iron (>bkg, Eco, SSL, & Res RSL)	acceptable HH and Eco risk value	
				lead (>bkg & Eco)	acceptable Eco risk value	
				mercury (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); exceeds acceptable Eco risk value	
				selenium (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				vanadium (>bkg & Res RSL)	acceptable HH risk value	
				zinc (>bkg & Eco)	acceptable Eco risk value	

Notes:
N/A - Not applicable

TABLE 3-7
Site 4 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1: Site Potentially CERCLA-eligible?	Step 1: Inorganics Above Background or Non-inorganics Detected?	Step 1: Potentially Attributable to CERCLA Release?	Step 2a: Exceedances of Comparison Criteria?	Step 2b: Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3: Is further Investigation or Action Required?
Site 4 Subsurface Soil	Yes	VOCs	Yes	chloroform (>bkg & SSL)	(HH risk value not evaluated quantitatively)	Yes
				ethylbenzene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				methylene chloride (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				tetrachloroethene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		SVOCs	Yes	benzo(a)anthracene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				benzo(a)pyrene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				benzo(b)fluoranthene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				benzo(k)fluoranthene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				bis (2-Ethylhexyl)phthalate (>bkg, Eco, SSL, & Res RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				di-n-butylphthalate (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
		Pesticides	Yes	4,4'-DDT (> bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				aldrin (>bkg, Eco & SSL)	(HH risk value not evaluated quantitatively); exceeds acceptable Eco risk value	
				endosulfan II (>bkg & Eco)	acceptable Eco risk value	
				endrin ketone (> bkg & Eco)	exceeds acceptable Eco risk value	
				heptachlor (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		PCBs	Yes	aroclor-1242 (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				aroclor-1260 (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
		Inorganics	Yes	aluminum (>bkg, Eco, & Res RSL)	acceptable HH risk value; exceeds acceptable Eco risk value	
				arsenic (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				chromium (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				mercury (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); exceeds acceptable Eco risk value	
				selenium (>bkg & Eco)	acceptable Eco risk value	
				vanadium (>bkg & Res RSL)	acceptable HH risk value	
				zinc (>bkg & Eco)	acceptable Eco risk value	
Site 4 Groundwater		VOCs	Yes	tetrachloroethene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value (groundwater and vapor intrusion from groundwater)	Yes
		SVOCs	No	N/A	N/A	
		Pesticides	No	N/A	N/A	
		PCBs	No	N/A	N/A	
		Total Inorganics	Yes	arsenic (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				iron (>bkg & Tapwater RSL)	acceptable HH risk value	
				manganese (>bkg & Tapwater RSL)	acceptable HH risk value	
		Dissolved Inorganics	Yes	dissolved arsenic (>bkg & Tapwater RSL)	acceptable HH risk value	
				dissolved manganese (>bkg & Tapwater RSL)	acceptable HH risk value	

Notes:
N/A - Not applicable

TABLE 3-7
Site 4 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1: Site Potentially CERCLA-eligible?	Step 1: Inorganics Above Background or Non-inorganics Detected?	Step 1: Potentially Attributable to CERCLA Release?	Step 2a: Exceedances of Comparison Criteria?	Step 2b: Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3: Is further Investigation or Action Required?
Site 4 Drainage Ditch Surface Sediment	Yes	VOCs	Yes	None	N/A	Yes
		SVOCs	Yes	Benzo(a)anthracene (>Eco)	acceptable Eco risk value	
				Benzo(a)pyrene (>Eco & Res Adj RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				Benzo(b)fluoranthene (>Eco)	acceptable Eco risk value	
				Chrysene (>Eco)	acceptable Eco risk value	
				Dibenz(a,h)anthracene (>Eco)	acceptable Eco risk value	
				Fluoranthene (>Eco)	acceptable Eco risk value	
				Indeno(1,2,3-cd)pyrene (>Eco)	acceptable Eco risk value	
				PAH (HMW) (>Eco)	acceptable Eco risk value	
				PAH (LMW) (>Eco)	acceptable Eco risk value	
				PAH (total) (>Eco)	acceptable Eco risk value	
				Phenanthrene (>Eco)	acceptable Eco risk value	
				Pyrene (>Eco)	acceptable Eco risk value	
		Pesticides	Yes	4,4'-DDD (>Eco)	acceptable Eco risk value	
				4,4'-DDE (>Eco)	acceptable Eco risk value	
				4,4'-DDT (>Eco)	acceptable Eco risk value	
				Endrin aldehyde (>Eco)	acceptable Eco risk value	
				gamma-Chlordane (>Eco)	acceptable Eco risk value	
		PCBs	Yes	Aroclor-1254 (>Eco)	acceptable Eco risk value	
				Aroclor-1260 (>Eco)	acceptable Eco risk value	
		Inorganics	Yes	Arsenic (>Eco & Res Adj RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				Barium (>Eco)	acceptable Eco risk value	
				Chromium (>Res Adj RSL)	exceeds acceptable HH risk value	
Site 4 Drainage Ditch Subsurface Sediemnt	Yes	VOCs	Yes	None	N/A	Yes
		SVOCs	Yes	Benzo(a)anthracene (>Eco)	acceptable Eco risk value	
				Dibenz(a,h)anthracene (>Eco)	acceptable Eco risk value	
		Pesticides	Yes	4,4'-DDD (>Eco)	acceptable Eco risk value	
				4,4'-DDE (>Eco)	acceptable Eco risk value	
				4,4'-DDT (>Eco)	acceptable Eco risk value	
				Dieldrin (>Eco)	acceptable Eco risk value	
				Endrin aldehyde (>Eco)	acceptable Eco risk value	
		PCBs	Yes	Aroclor-1254 (>Eco)	acceptable Eco risk value	
				Aroclor-1260 (>Eco)	acceptable Eco risk value	
		Inorganics	Yes	Aluminum (>Eco)	acceptable Eco risk value	
				Arsenic (>Eco & Res Adj RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				Barium (>Eco)	acceptable Eco risk value	
				Cadmium (>Eco)	acceptable Eco risk value	
				Chromium (>Eco & Res Adj RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				Iron (>Eco)	acceptable Eco risk value	
				vanadium (>Eco)	acceptable Eco risk value	

Notes:
N/A - Not applicable

TABLE 3-7
Site 4 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1: Site Potentially CERCLA-eligible?	Step 1: Inorganics Above Background or Non-inorganics Detected?	Step 1: Potentially Attributable to CERCLA Release?	Step 2a: Exceedances of Comparison Criteria?	Step 2b: Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3: Is further Investigation or Action Required?
Site 4 Drainage Ditch Surface Water	Yes	VOCs	No	N/A	N/A	Yes
		SVOCs	Yes	Pyrene (>Eco)	exceeds acceptable Eco risk value	
		Pesticides	No	N/A	N/A	
		PCBs	No	N/A	N/A	
		Total Inorganics	Yes	Aluminum (>Eco)	acceptable Eco risk value	
				Arsenic (>Res Adj RSL)	exceeds acceptable HH risk value	
				Barium (>Eco)	acceptable Eco risk value	
				Iron (>Eco & Res Adj RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Manganese (>Eco)	acceptable Eco risk value	
		Dissolved Inorganics	Yes	Dissolved Arsenic (>Res Adj RSL)	exceeds acceptable HH risk value	
				Dissolved Barium (>Eco)	acceptable Eco risk value	
				Dissolved Iron (>Eco & Res Adj RSL)	exceeds acceptable Eco risk value	
				Dissolved Manganese (>Eco)	acceptable Eco risk value	

Notes:
N/A - Not applicable

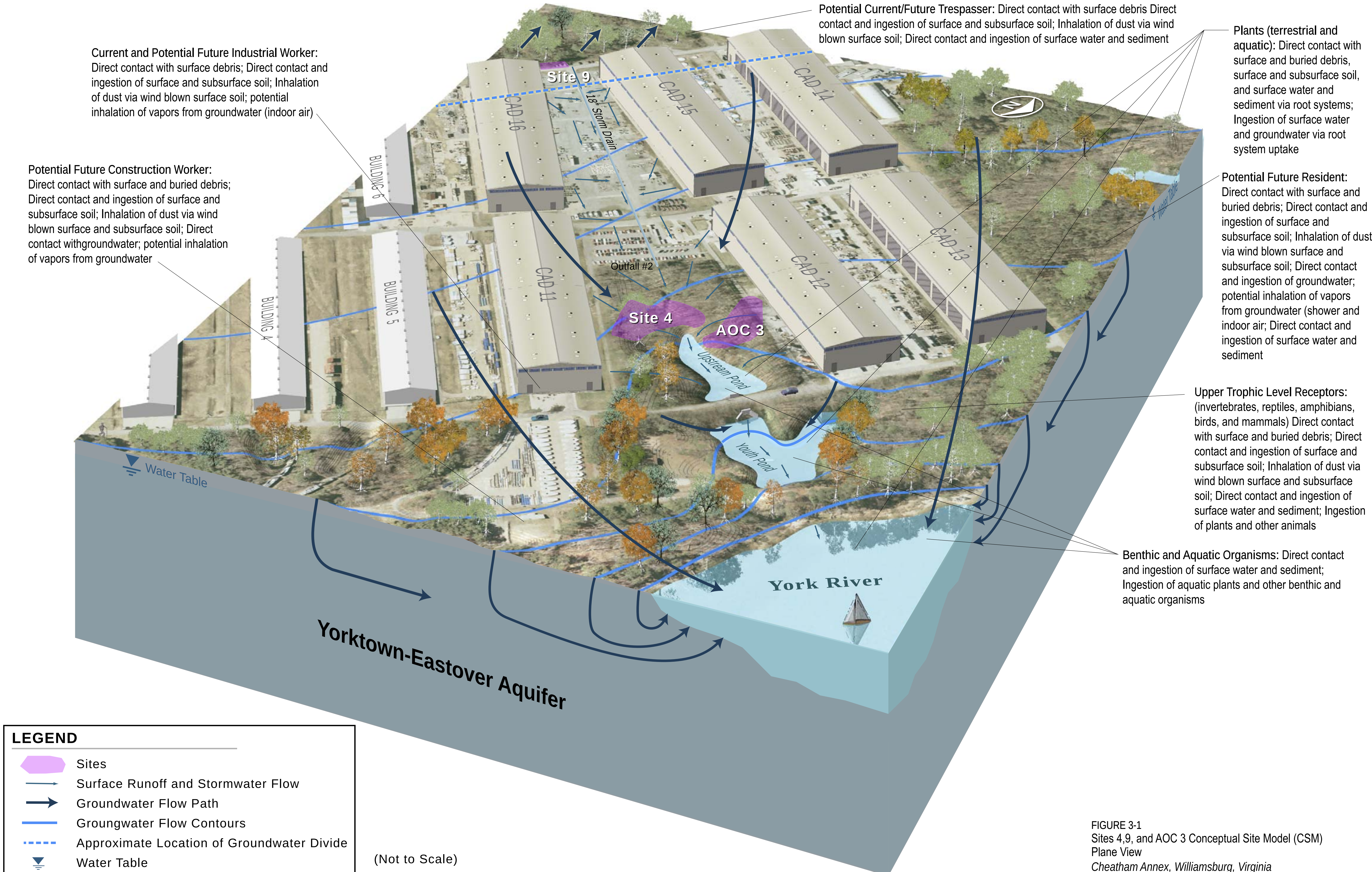


FIGURE 3-1
Sites 4,9, and AOC 3 Conceptual Site Model (CSM)
Plane View
Cheatham Annex, Williamsburg, Virginia

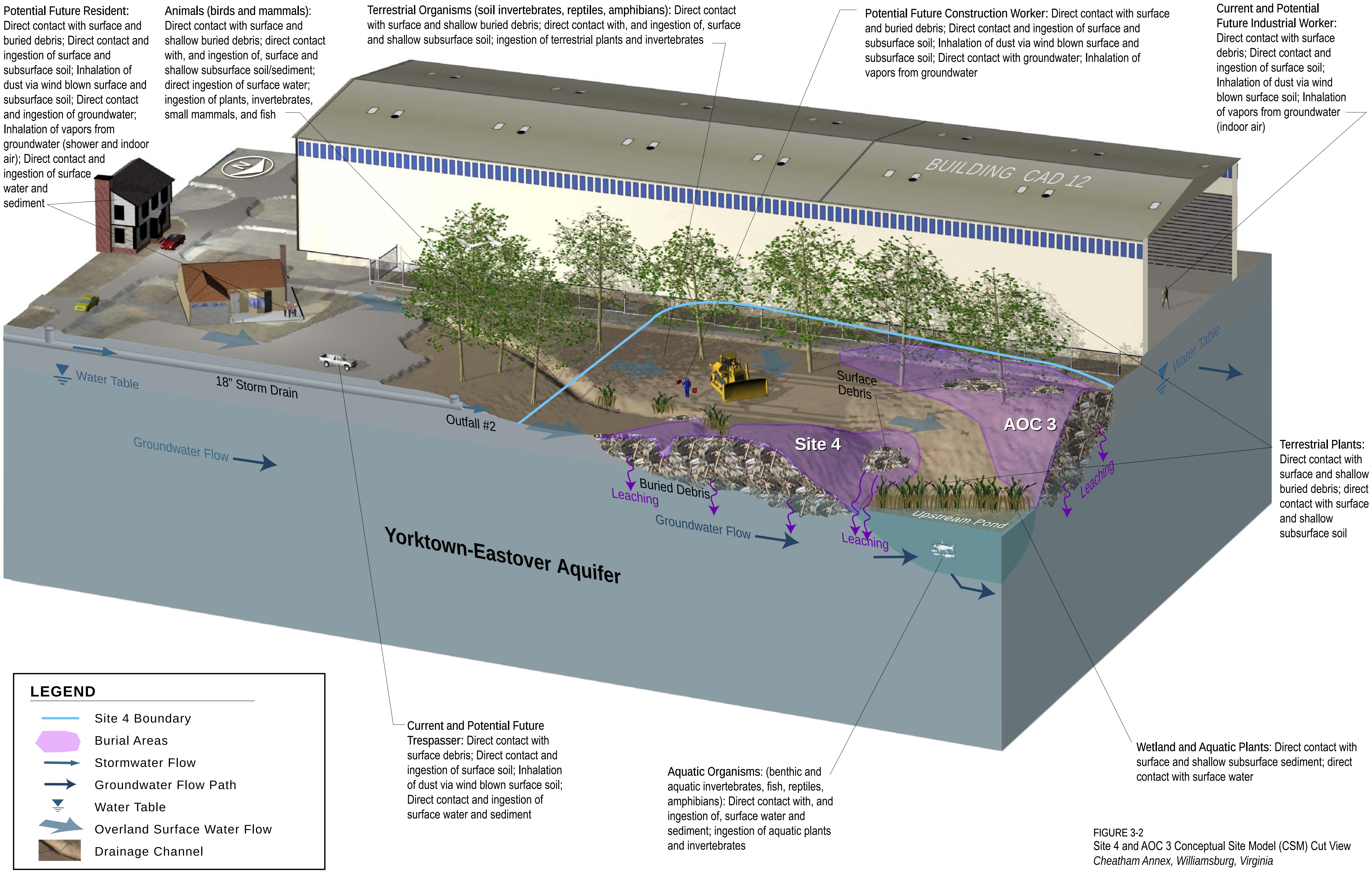
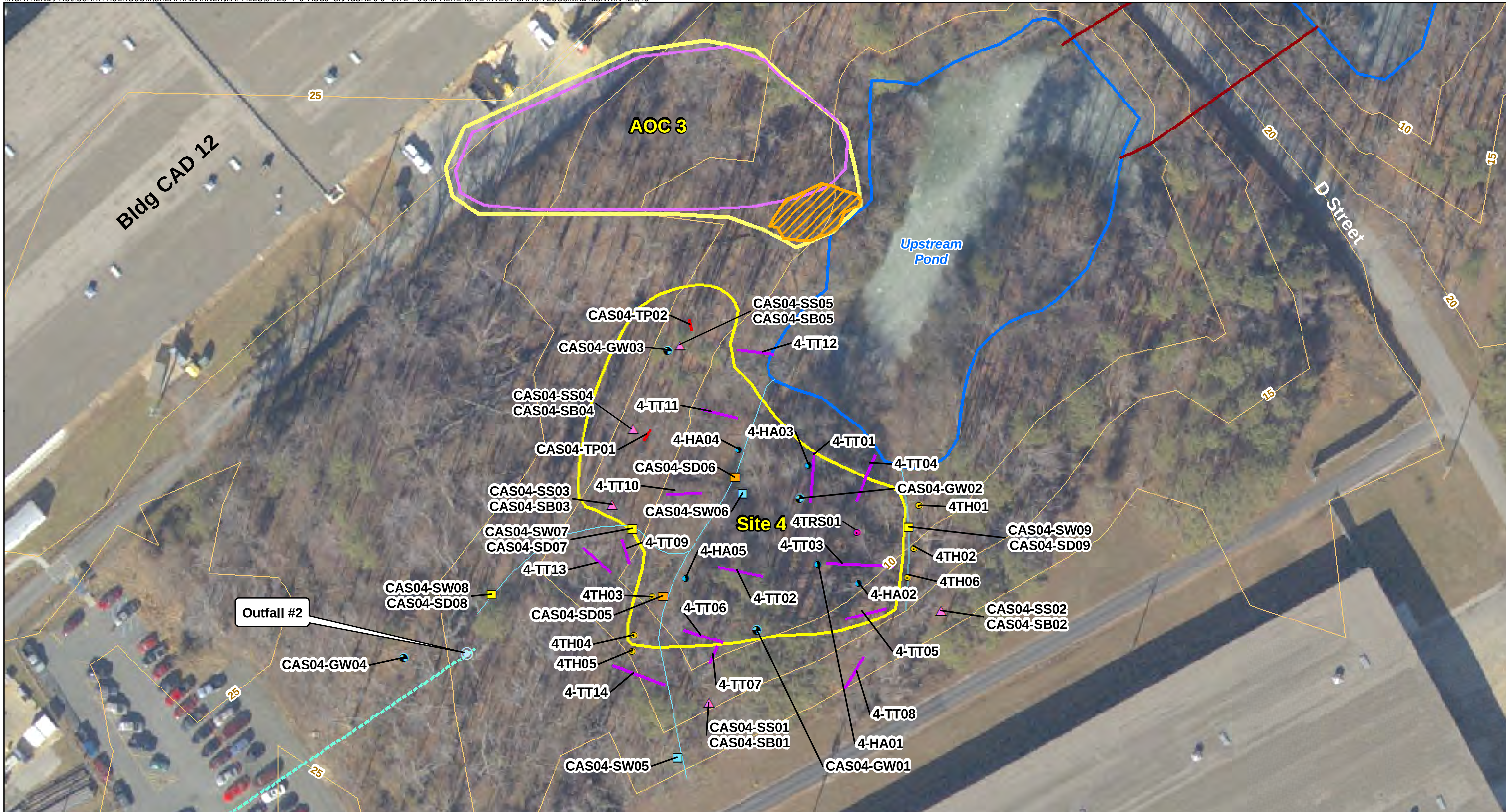


FIGURE 3-2
Site 4 and AOC 3 Conceptual Site Model (CSM) Cut View
Cheatham Annex, Williamsburg, Virginia

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE 3-3 - SITE 4 COMPREHENSIVE INVESTIGATION LOCS.MXD MUNWIN 12/9/10



Legend

- 1999 Soil Sample
- 2001 TCLP Sample
- 2001 Test Hole
- Outfall
- 2001 Test Pit
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Study Area Boundary
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)
- 2009 SI Surface Water Sample Location
- 2009 SI Surface Water/Sediment Sample Location
- 2009 SI Well Point Groundwater Sample Location
- 2009 SI Soil Sample Location
- 2009 SI Test Pit

Figure 3-3
Site 4 Comprehensive Investigation Locations
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE3-4_SITE4_EXTENT_BURIED_DEBRIS.MXD MUNWIN 9/2/10

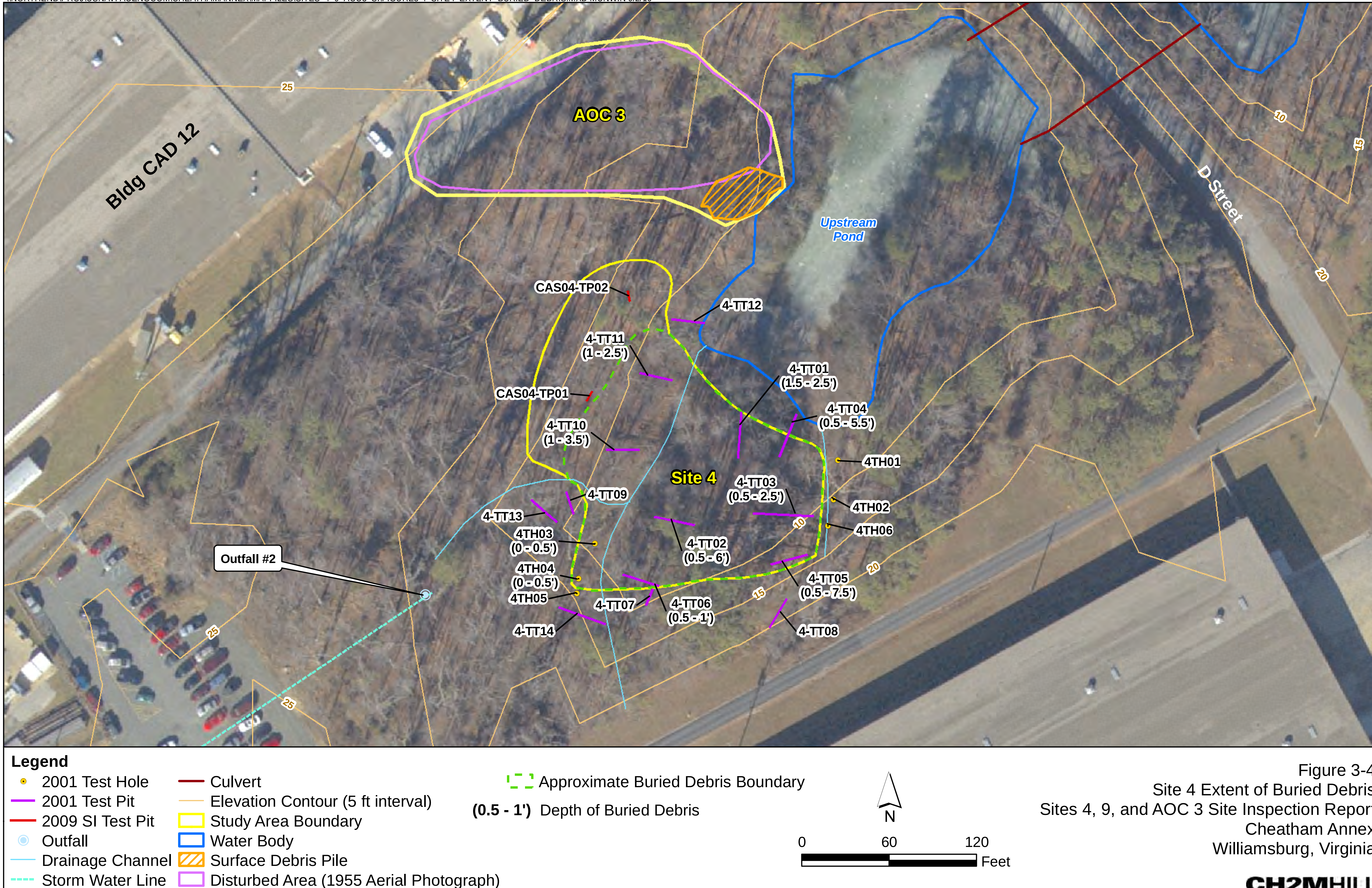

Figure 3-4
Site 4 Extent of Buried Debris
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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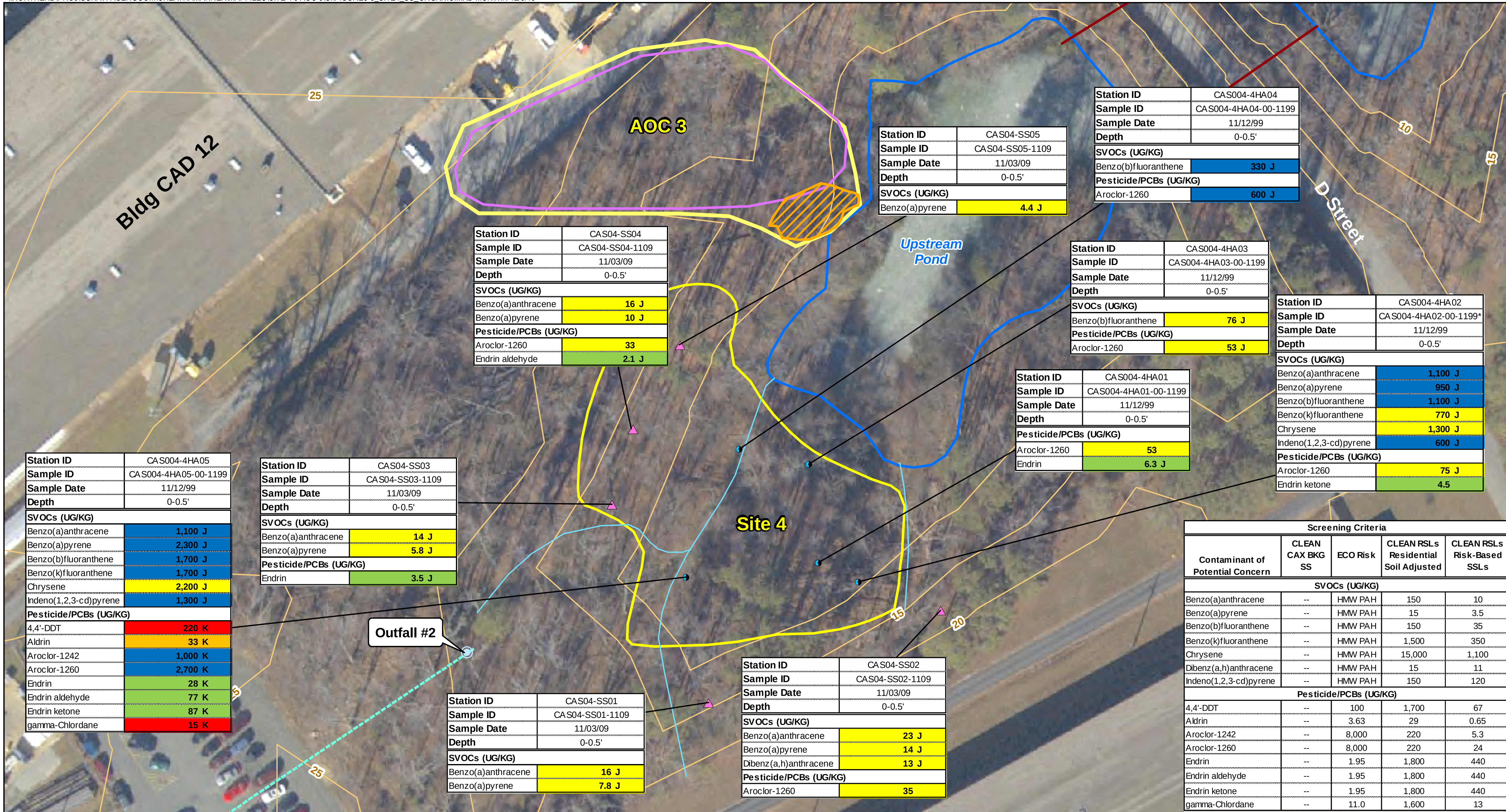
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE3-5_SITE4_SS_ORGANIC.MXD MUNWIN 12/9/10



Station ID	CAS04-SS05
Sample ID	CAS04-SS05-1109
Sample Date	11/03/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)pyrene	4.4 J

Station ID	CAS004-4HA04
Sample ID	CAS004-4HA04-00-1199
Sample Date	11/12/99
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(b)fluoranthene	330 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	600 J

Station ID	CAS04-SS04
Sample ID	CAS04-SS04-1109
Sample Date	11/03/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	16 J
Benzo(a)pyrene	10 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	33
Endrin aldehyde	2.1 J

Station ID	CAS004-4HA03
Sample ID	CAS004-4HA03-00-1199
Sample Date	11/12/99
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(b)fluoranthene	76 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	53 J

Station ID	CAS004-4HA02
Sample ID	CAS004-4HA02-00-1199*
Sample Date	11/12/99
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	1,100 J
Benzo(a)pyrene	950 J
Benzo(b)fluoranthene	1,100 J
Benzo(k)fluoranthene	770 J
Chrysene	1,300 J
Indeno(1,2,3-cd)pyrene	600 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	75 J
Endrin ketone	4.5

Station ID	CAS004-4HA01
Sample ID	CAS004-4HA01-00-1199
Sample Date	11/12/99
Depth	0-0.5'
Pesticide/PCBs (UG/KG)	
Aroclor-1260	53
Endrin	6.3 J

Station ID	CAS004-4HA05
Sample ID	CAS004-4HA05-00-1199
Sample Date	11/12/99
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	1,100 J
Benzo(a)pyrene	2,300 J
Benzo(b)fluoranthene	1,700 J
Benzo(k)fluoranthene	1,700 J
Chrysene	2,200 J
Indeno(1,2,3-cd)pyrene	1,300 J
Pesticide/PCBs (UG/KG)	
4,4'-DDT	220 K
Aldrin	33 K
Aroclor-1242	1,000 K
Aroclor-1260	2,700 K
Endrin	28 K
Endrin aldehyde	77 K
Endrin ketone	87 K
gamma-Chlordane	15 K

Station ID	CAS04-SS03
Sample ID	CAS04-SS03-1109
Sample Date	11/03/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	14 J
Benzo(a)pyrene	5.8 J
Pesticide/PCBs (UG/KG)	
Endrin	3.5 J

Station ID	CAS04-SS01
Sample ID	CAS04-SS01-1109
Sample Date	11/03/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	16 J
Benzo(a)pyrene	7.8 J

Station ID	CAS04-SS02
Sample ID	CAS04-SS02-1109
Sample Date	11/03/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	23 J
Benzo(a)pyrene	14 J
Dibenz(a,h)anthracene	13 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	35

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
SVOCs (UG/KG)				
Benzo(a)anthracene	--	HMW PAH	150	10
Benzo(a)pyrene	--	HMW PAH	15	3.5
Benzo(b)fluoranthene	--	HMW PAH	150	35
Benzo(k)fluoranthene	--	HMW PAH	1,500	350
Chrysene	--	HMW PAH	15,000	1,100
Dibenz(a,h)anthracene	--	HMW PAH	15	11
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120
Pesticide/PCBs (UG/KG)				
4,4'-DDT	--	100	1,700	67
Aldrin	--	3.63	29	0.65
Aroclor-1242	--	8,000	220	5.3
Aroclor-1260	--	8,000	220	24
Endrin	--	1.95	1,800	440
Endrin aldehyde	--	1.95	1,800	440
Endrin ketone	--	1.95	1,800	440
gamma-Chlordane	--	11.0	1,600	13

Legend

- 2009 SI Soil Sample Location
- 1999 Soil Sample
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Notes:

- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 60 120 Feet

Figure 3-5
Site 4 Surface Soil Organic Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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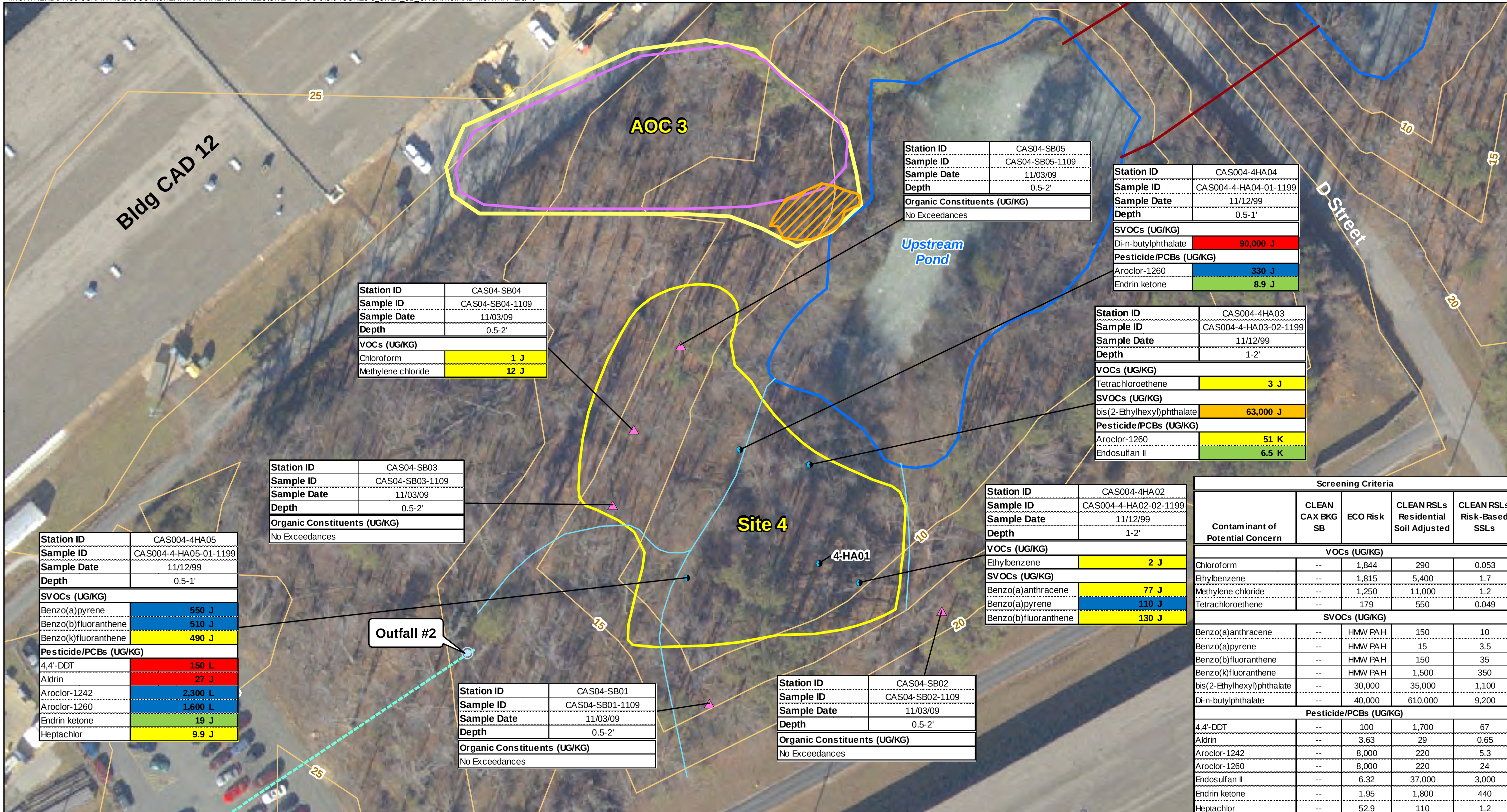
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE3-6_SITE4_SB_ORGANIC.MXD MUNWIN 12/9/10



Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
VOCs (UG/KG)				
Chloroform	--	1,844	290	0.053
Ethylbenzene	--	1,815	5,400	1.7
Methylene chloride	--	1,250	11,000	1.2
Tetrachloroethene	--	179	550	0.049
SVOCs (UG/KG)				
Benzo(a)anthracene	--	HMW PAH	150	10
Benzo(a)pyrene	--	HMW PAH	15	3.5
Benzo(b)fluoranthene	--	HMW PAH	150	35
Benzo(k)fluoranthene	--	HMW PAH	1,500	350
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100
Di-n-butylphthalate	--	40,000	610,000	9,200
Pesticide/PCBs (UG/KG)				
4,4'-DDT	--	100	1,700	67
Aldrin	--	3.63	29	0.65
Aroclor-1242	--	8,000	220	5.3
Aroclor-1260	--	8,000	220	24
Endosulfan II	--	6.32	37,000	3,000
Endrin ketone	--	1.95	1,800	440
Heptachlor	--	52.9	110	1.2

Legend

- 2009 SI Soil Sample Location
- 1999 Soil Sample
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Notes:

- Exceeds Background
- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

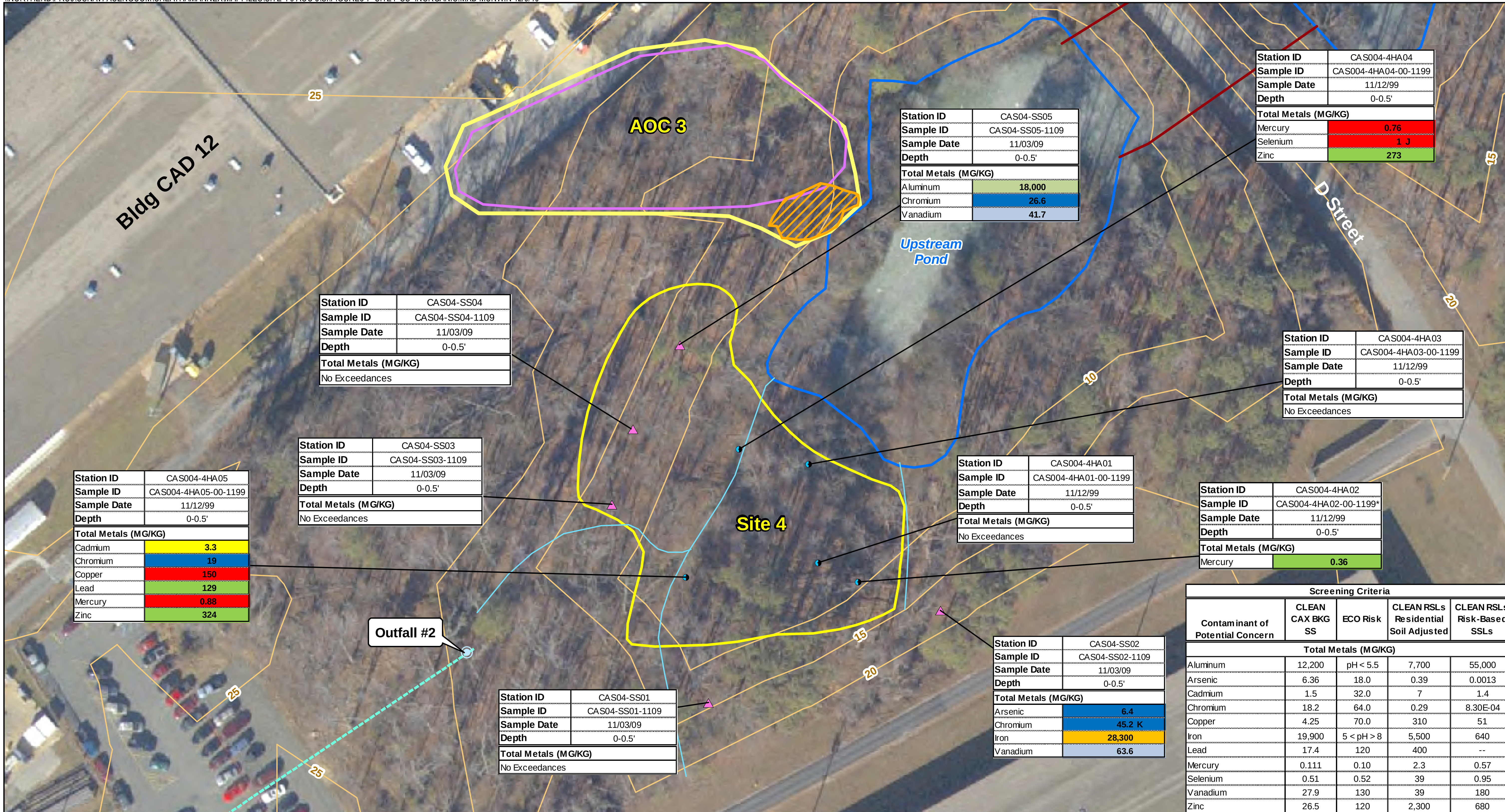
N

0 60 120 Feet

Figure 3-6
Site 4 Subsurface Soil Organic Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE3-7_SITE4_SS_INORGANIC.MXD MUNWIN 12/9/10



Station ID	CAS004-4HA04
Sample ID	CAS004-4HA04-00-1199
Sample Date	11/12/99
Depth	0-0.5'
Total Metals (MG/KG)	
Mercury	0.76
Selenium	1 J
Zinc	273

Station ID	CAS04-SS05
Sample ID	CAS04-SS05-1109
Sample Date	11/03/09
Depth	0-0.5'
Total Metals (MG/KG)	
Aluminum	18,000
Chromium	26.6
Vanadium	41.7

Station ID	CAS04-SS04
Sample ID	CAS04-SS04-1109
Sample Date	11/03/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAS004-4HA03
Sample ID	CAS004-4HA03-00-1199
Sample Date	11/12/99
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAS04-SS03
Sample ID	CAS04-SS03-1109
Sample Date	11/03/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAS004-4HA05
Sample ID	CAS004-4HA05-00-1199
Sample Date	11/12/99
Depth	0-0.5'
Total Metals (MG/KG)	
Cadmium	3.3
Chromium	19
Copper	150
Lead	129
Mercury	0.88
Zinc	324

Station ID	CAS004-4HA01
Sample ID	CAS004-4HA01-00-1199
Sample Date	11/12/99
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAS004-4HA02
Sample ID	CAS004-4HA02-00-1199*
Sample Date	11/12/99
Depth	0-0.5'
Total Metals (MG/KG)	
Mercury	0.36

Station ID	CAS04-SS02
Sample ID	CAS04-SS02-1109
Sample Date	11/03/09
Depth	0-0.5'
Total Metals (MG/KG)	
Arsenic	6.4
Chromium	45.2 K
Iron	28,300
Vanadium	63.6

Station ID	CAS04-SS01
Sample ID	CAS04-SS01-1109
Sample Date	11/03/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
Total Metals (MG/KG)				
Aluminum	12,200	pH < 5.5	7,700	55,000
Arsenic	6.36	18.0	0.39	0.0013
Cadmium	1.5	32.0	7	1.4
Chromium	18.2	64.0	0.29	8.30E-04
Copper	4.25	70.0	310	51
Iron	19,900	5 < pH > 8	5,500	640
Lead	17.4	120	400	--
Mercury	0.111	0.10	2.3	0.57
Selenium	0.51	0.52	39	0.95
Vanadium	27.9	130	39	180
Zinc	26.5	120	2,300	680

Legend

- 2009 SI Soil Sample Location
- 1999 Soil Sample
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Notes:

- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

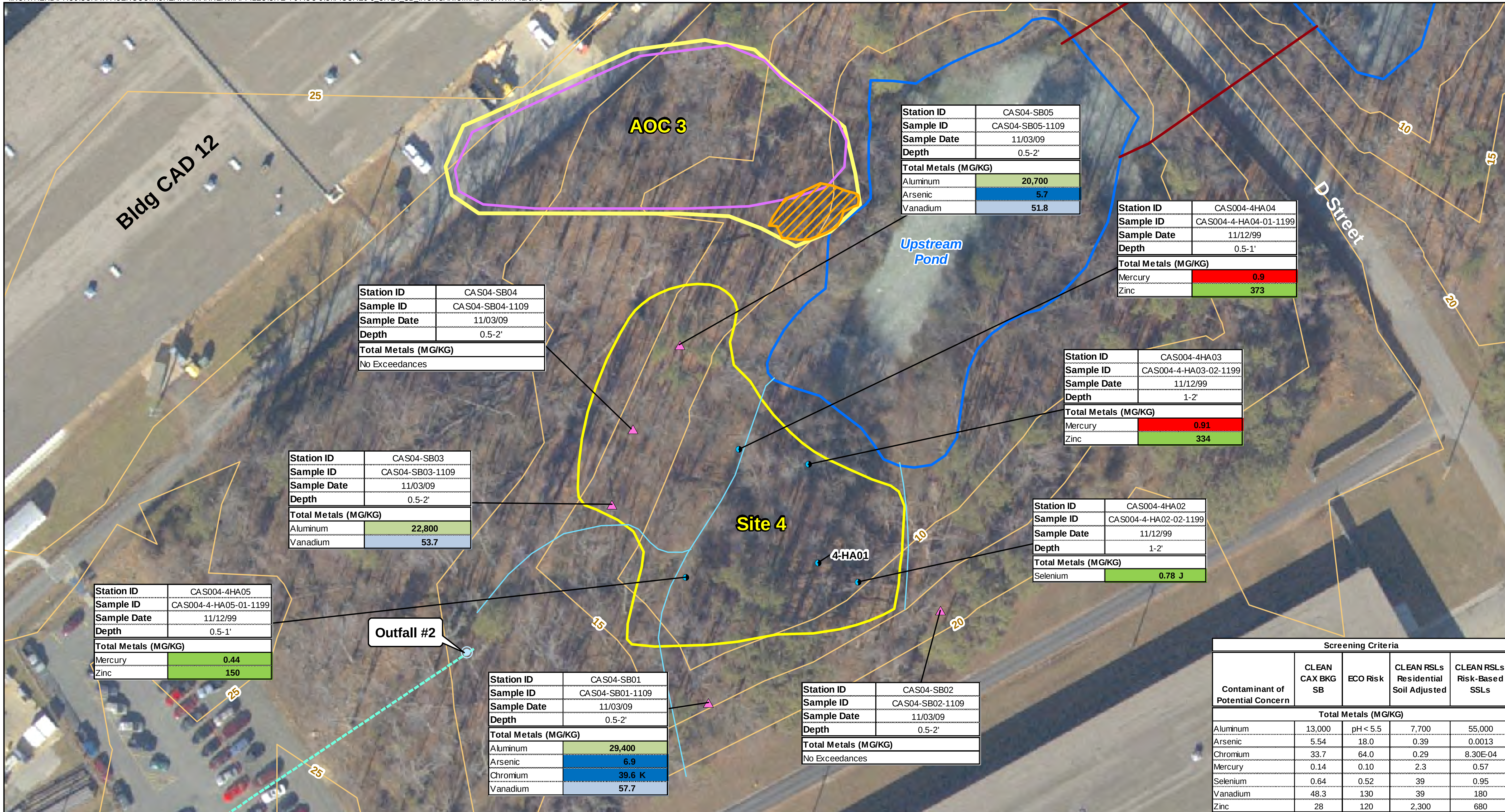
N

0 60 120 Feet

Figure 3-7
Site 4 Surface Soil Inorganic Exceedance Results
Sites 4, 9, and AOC 3 Site Investigation
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE3-8_SITE4_SB_INORGANIC.MXD MUNWIN 12/9/10



Screening Criteria				
Contaminant of Potential Concern	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
Total Metals (MG/KG)				
Aluminum	13,000	pH < 5.5	7,700	55,000
Arsenic	5.54	18.0	0.39	0.0013
Chromium	33.7	64.0	0.29	8.30E-04
Mercury	0.14	0.10	2.3	0.57
Selenium	0.64	0.52	39	0.95
Vanadium	48.3	130	39	180
Zinc	28	120	2,300	680

Legend

- 2009 SI Soil Sample Location
- 1999 Soil Sample
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Notes:

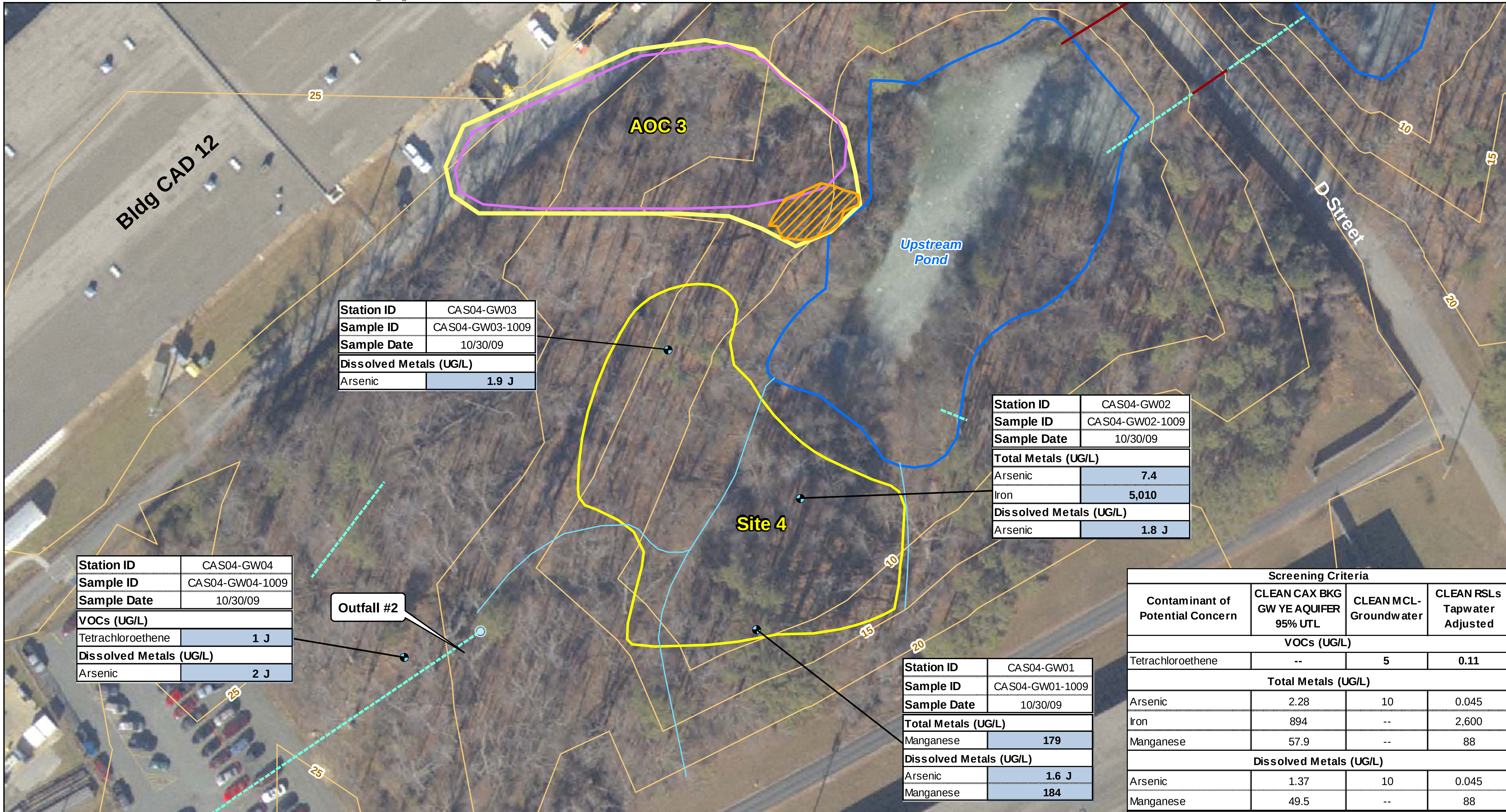
- Exceeds Background
- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

N

0 60 120 Feet

Figure 3-8
Site 4 Subsurface Soil Inorganic Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL



Station ID	CAS04-GW03
Sample ID	CAS04-GW03-1009
Sample Date	10/30/09
Dissolved Metals (UG/L)	
Arsenic	1.9 J

Station ID	CAS04-GW02
Sample ID	CAS04-GW02-1009
Sample Date	10/30/09
Total Metals (UG/L)	
Arsenic	7.4
Iron	5,010
Dissolved Metals (UG/L)	
Arsenic	1.8 J

Station ID	CAS04-GW04
Sample ID	CAS04-GW04-1009
Sample Date	10/30/09
VOCs (UG/L)	
Tetrachloroethene	1 J
Dissolved Metals (UG/L)	
Arsenic	2 J

Station ID	CAS04-GW01
Sample ID	CAS04-GW01-1009
Sample Date	10/30/09
Total Metals (UG/L)	
Manganese	179
Dissolved Metals (UG/L)	
Arsenic	1.6 J
Manganese	184

Screening Criteria			
Contaminant of Potential Concern	CLEAN CAX BKG GW YE AQUIFER 95% UTL	CLEAN MCL-Groundwater	CLEAN RSLs Tapwater Adjusted
VOCs (UG/L)			
Tetrachloroethene	--	5	0.11
Total Metals (UG/L)			
Arsenic	2.28	10	0.045
Iron	894	--	2,600
Manganese	57.9	--	88
Dissolved Metals (UG/L)			
Arsenic	1.37	10	0.045
Manganese	49.5	--	88

Legend

- 2009 SI Well Point Groundwater Sample Location
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds BKG & MCL
Exceeds BKG & RSL
Exceeds BKG, MCL & RSL

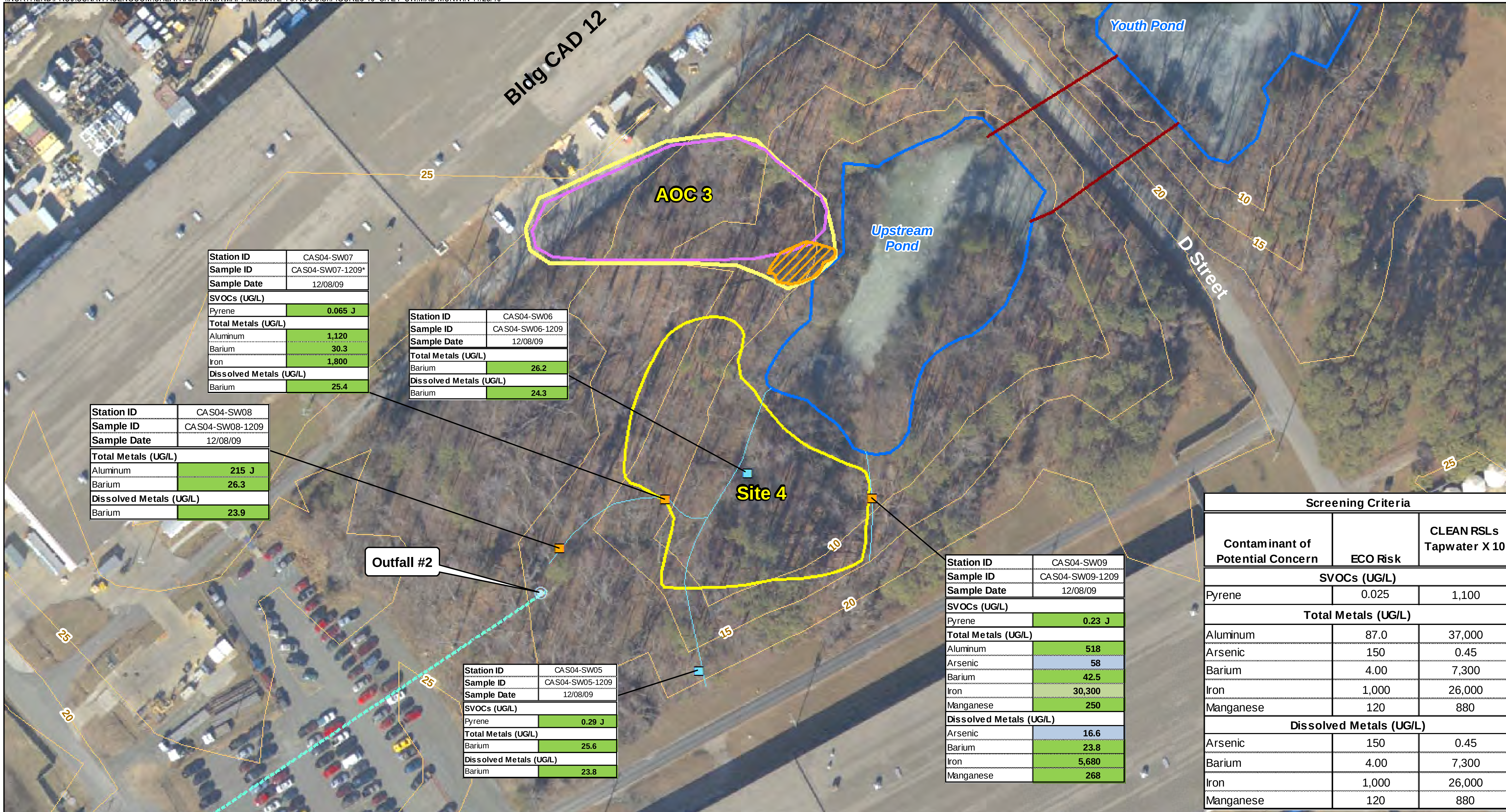
N

0 60 120 Feet

Figure 3-9
Site 4 Groundwater Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE3-10_SITE4_SW.MXD MUNWIN 11/23/10



Station ID	CAS04-SW07
Sample ID	CAS04-SW07-1209*
Sample Date	12/08/09
SVOCs (UG/L)	
Pyrene	0.065 J
Total Metals (UG/L)	
Aluminum	1,120
Barium	30.3
Iron	1,800
Dissolved Metals (UG/L)	
Barium	25.4

Station ID	CAS04-SW06
Sample ID	CAS04-SW06-1209
Sample Date	12/08/09
Total Metals (UG/L)	
Barium	26.2
Dissolved Metals (UG/L)	
Barium	24.3

Station ID	CAS04-SW08
Sample ID	CAS04-SW08-1209
Sample Date	12/08/09
Total Metals (UG/L)	
Aluminum	215 J
Barium	26.3
Dissolved Metals (UG/L)	
Barium	23.9

Station ID	CAS04-SW05
Sample ID	CAS04-SW05-1209
Sample Date	12/08/09
SVOCs (UG/L)	
Pyrene	0.29 J
Total Metals (UG/L)	
Barium	25.6
Dissolved Metals (UG/L)	
Barium	23.8

Station ID	CAS04-SW09
Sample ID	CAS04-SW09-1209
Sample Date	12/08/09
SVOCs (UG/L)	
Pyrene	0.23 J
Total Metals (UG/L)	
Aluminum	518
Arsenic	58
Barium	42.5
Iron	30,300
Manganese	250
Dissolved Metals (UG/L)	
Arsenic	16.6
Barium	23.8
Iron	5,680
Manganese	268

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Tapwater X 10
SVOCs (UG/L)		
Pyrene	0.025	1,100
Total Metals (UG/L)		
Aluminum	87.0	37,000
Arsenic	150	0.45
Barium	4.00	7,300
Iron	1,000	26,000
Manganese	120	880
Dissolved Metals (UG/L)		
Arsenic	150	0.45
Barium	4.00	7,300
Iron	1,000	26,000
Manganese	120	880

Legend

- 2009 SI Surface Water Sample Location
- 2009 SI Surface Water/Sediment Sample Location
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

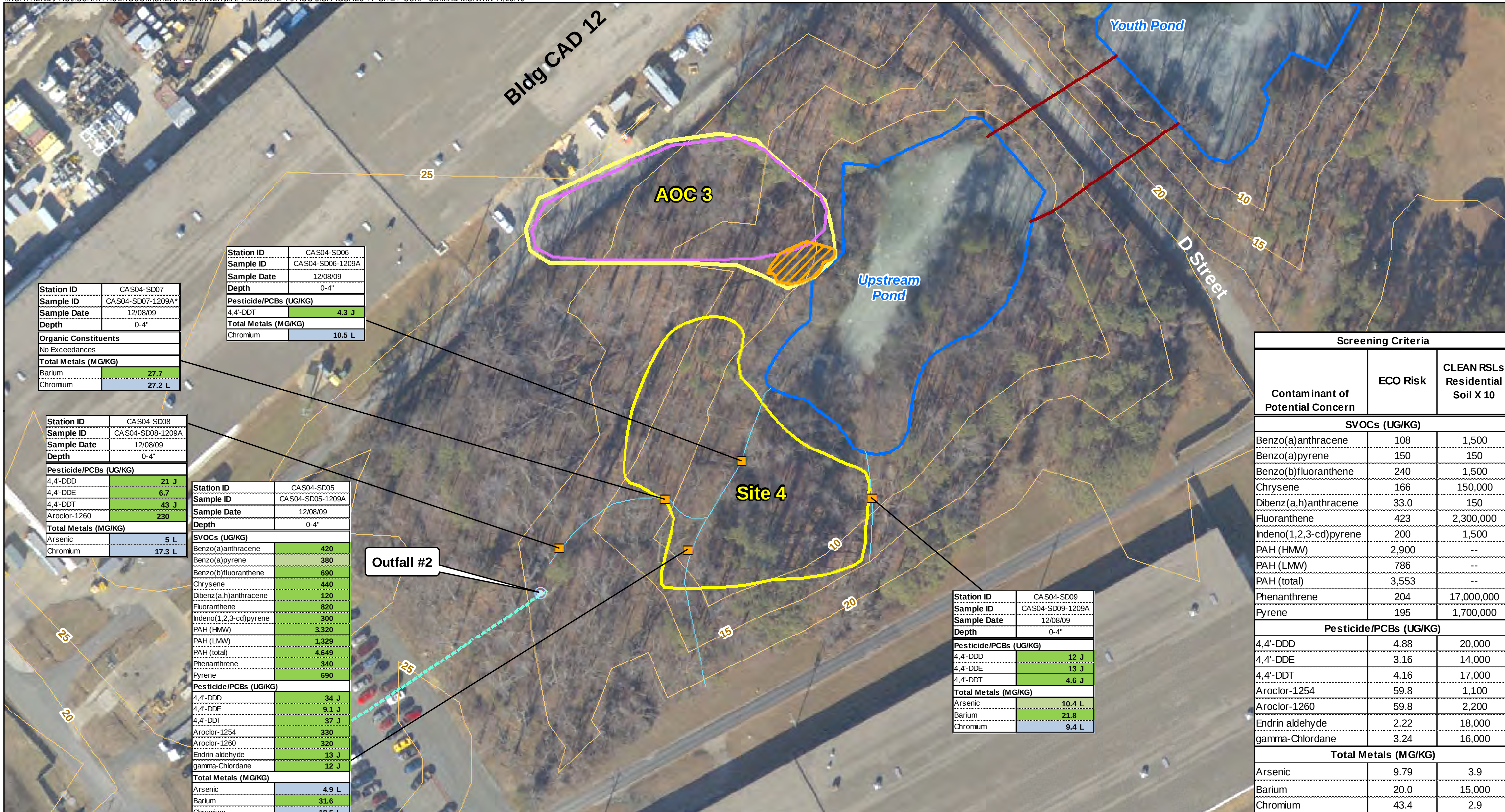
N

0 80 160 Feet

Figure 3-10
Site 4 Surface Water Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE3-11_SITE4_SURF_SD.MXD MUNWIN 11/23/10



Station ID	CAS04-SD07
Sample ID	CAS04-SD07-1209A*
Sample Date	12/08/09
Depth	0-4"
Organic Constituents	
No Exceedances	
Total Metals (MG/KG)	
Barium	27.7
Chromium	27.2 L

Station ID	CAS04-SD06
Sample ID	CAS04-SD06-1209A
Sample Date	12/08/09
Depth	0-4"
Pesticide/PCBs (UG/KG)	
4,4'-DDT	4.3 J
Total Metals (MG/KG)	
Chromium	10.5 L

Station ID	CAS04-SD08
Sample ID	CAS04-SD08-1209A
Sample Date	12/08/09
Depth	0-4"
Pesticide/PCBs (UG/KG)	
4,4'-DDD	21 J
4,4'-DDE	6.7
4,4'-DDT	43 J
Aroclor-1260	230
Total Metals (MG/KG)	
Arsenic	5 L
Chromium	17.3 L

Station ID	CAS04-SD05
Sample ID	CAS04-SD05-1209A
Sample Date	12/08/09
Depth	0-4"
SVOCs (UG/KG)	
Benzo(a)anthracene	420
Benzo(a)pyrene	380
Benzo(b)fluoranthene	690
Chrysene	440
Dibenz(a,h)anthracene	120
Fluoranthene	820
Indeno(1,2,3-cd)pyrene	300
PAH (HMW)	3,320
PAH (LMW)	1,329
PAH (total)	4,649
Phenanthrene	340
Pyrene	690
Pesticide/PCBs (UG/KG)	
4,4'-DDD	34 J
4,4'-DDE	9.1 J
4,4'-DDT	37 J
Aroclor-1254	330
Aroclor-1260	320
Endrin aldehyde	13 J
gamma-Chlordane	12 J
Total Metals (MG/KG)	
Arsenic	4.9 L
Barium	31.6
Chromium	18.5 L

Station ID	CAS04-SD09
Sample ID	CAS04-SD09-1209A
Sample Date	12/08/09
Depth	0-4"
Pesticide/PCBs (UG/KG)	
4,4'-DDD	12 J
4,4'-DDE	13 J
4,4'-DDT	4.6 J
Total Metals (MG/KG)	
Arsenic	10.4 L
Barium	21.8
Chromium	9.4 L

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil X 10
SVOCs (UG/KG)		
Benzo(a)anthracene	108	1,500
Benzo(a)pyrene	150	150
Benzo(b)fluoranthene	240	1,500
Chrysene	166	150,000
Dibenz(a,h)anthracene	33.0	150
Fluoranthene	423	2,300,000
Indeno(1,2,3-cd)pyrene	200	1,500
PAH (HMW)	2,900	--
PAH (LMW)	786	--
PAH (total)	3,553	--
Phenanthrene	204	17,000,000
Pyrene	195	1,700,000
Pesticide/PCBs (UG/KG)		
4,4'-DDD	4.88	20,000
4,4'-DDE	3.16	14,000
4,4'-DDT	4.16	17,000
Aroclor-1254	59.8	1,100
Aroclor-1260	59.8	2,200
Endrin aldehyde	2.22	18,000
gamma-Chlordane	3.24	16,000
Total Metals (MG/KG)		
Arsenic	9.79	3.9
Barium	20.0	15,000
Chromium	43.4	2.9

Legend

- 2009 SI Sediment Sample Location
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

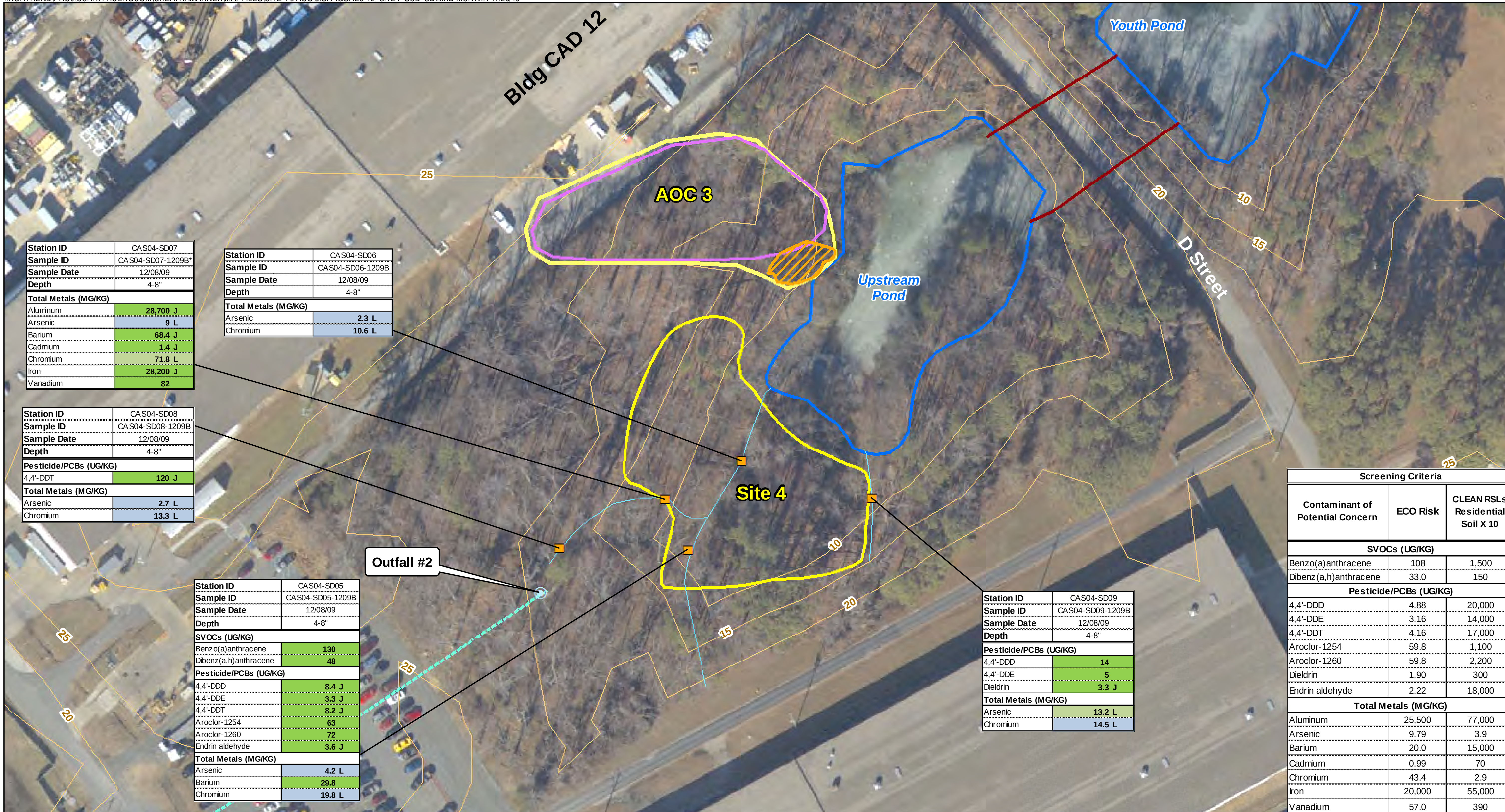
N

0 80 160 Feet

Figure 3-11
Site 4 Surface Sediment Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE3-12_SITE4_SUB_SD.MXD MUNWIN 11/23/10



Station ID	CAS04-SD07
Sample ID	CAS04-SD07-1209B*
Sample Date	12/08/09
Depth	4-8"
Total Metals (MG/KG)	
Aluminum	28,700 J
Arsenic	9 L
Barium	68.4 J
Cadmium	1.4 J
Chromium	71.8 L
Iron	28,200 J
Vanadium	82

Station ID	CAS04-SD06
Sample ID	CAS04-SD06-1209B
Sample Date	12/08/09
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	2.3 L
Chromium	10.6 L

Station ID	CAS04-SD08
Sample ID	CAS04-SD08-1209B
Sample Date	12/08/09
Depth	4-8"
Pesticide/PCBs (UG/KG)	
4,4'-DDT	120 J
Total Metals (MG/KG)	
Arsenic	2.7 L
Chromium	13.3 L

Station ID	CAS04-SD05
Sample ID	CAS04-SD05-1209B
Sample Date	12/08/09
Depth	4-8"
SVOCs (UG/KG)	
Benzo(a)anthracene	130
Dibenz(a,h)anthracene	48
Pesticide/PCBs (UG/KG)	
4,4'-DDD	8.4 J
4,4'-DDE	3.3 J
4,4'-DDT	8.2 J
Aroclor-1254	63
Aroclor-1260	72
Endrin aldehyde	3.6 J
Total Metals (MG/KG)	
Arsenic	4.2 L
Barium	29.8
Chromium	19.8 L

Station ID	CAS04-SD09
Sample ID	CAS04-SD09-1209B
Sample Date	12/08/09
Depth	4-8"
Pesticide/PCBs (UG/KG)	
4,4'-DDD	14
4,4'-DDE	5
Dieldrin	3.3 J
Total Metals (MG/KG)	
Arsenic	13.2 L
Chromium	14.5 L

Screening Criteria		
Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil X 10
SVOCs (UG/KG)		
Benzo(a)anthracene	108	1,500
Dibenz(a,h)anthracene	33.0	150
Pesticide/PCBs (UG/KG)		
4,4'-DDD	4.88	20,000
4,4'-DDE	3.16	14,000
4,4'-DDT	4.16	17,000
Aroclor-1254	59.8	1,100
Aroclor-1260	59.8	2,200
Dieldrin	1.90	300
Endrin aldehyde	2.22	18,000
Total Metals (MG/KG)		
Aluminum	25,500	77,000
Arsenic	9.79	3.9
Barium	20.0	15,000
Cadmium	0.99	70
Chromium	43.4	2.9
Iron	20,000	55,000
Vanadium	57.0	390

Legend

- 2009 SI Sediment Sample Location
- Study Area Boundary
- Outfall
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 80 160 Feet

Figure 3-12
Site 4 Subsurface Sediment Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

SECTION 4

Site 9—Former Transformer Storage Area

This section presents an evaluation of the results from the SI performed at Site 9. The section includes a summary of the previous investigations conducted at the site, the conceptual site model, and the release assessment decision analysis.

4.1 History of Investigations

The following investigations were previously conducted and documented at Site 9:

- *Initial Assessment Study of Naval Supply Center (Norfolk) Cheatham Annex and Yorktown Fuels Division*. (NEESA, 1984)
- *Confirmation Study Step 1A (Verification) Round One, Naval Supply Center, Cheatham Annex, Williamsburg, VA and Naval Supply Center, Yorktown Fuels Division, Yorktown, VA* (Dames & Moore, 1986)
- *Remedial Investigation Interim Report, Naval Supply Center (Norfolk) Cheatham Annex* (Dames & Moore, 1991)
- *Draft Final No Further Response Action Planned Decision Document Site 9 - Transformer Storage Area* (Baker, 1999a)
- *Screening Level Ecological Risk Assessment Report for Sites 4 and 9. Naval Weapons Station Yorktown Cheatham Annex, Williamsburg, Virginia.* (Baker, 2005a)

4.2 Conceptual Site Model

The CSM for Site 9 is based on the data collected as part of the previous investigations and the SI. The conceptual site model interprets the physical characteristics, the distribution of contamination and potential contaminant source, potential migration pathways, and the potential exposure and receptor pathways. The conceptual site model for Site 9 is shown in **Figure 4-1.**

4.2.1 Site History and Potential Sources of Release

Between 1973 and 1980, electrical transformers, some of which contained PCBs, were stored at Site 9 (NEESA, 1984). These transformers were awaiting transfer or disposal. The storage area surface consisted of exposed soil enclosed by an earthen containment wall. There is the potential that spills from the PCB-containing transformers occurred; however, there are no reports of releases from the transformers during storage. After 1980, when the transformers were removed, the area was graded and covered with gravel. Limited grassy cover now grows within the graveled area.

Initial Assessment Study

Site 9 was included in the Initial Assessment Study conducted by the NEESA along with 11 other sites that were chosen as potentially contaminated based on information collected from historical records, aerial photographs, field inspections, and personnel interviews (NEESA, 1984). The site was evaluated to determine the type of contamination, migration pathways, and pollutant receptors.

The study found that the soils at Site 9 are well-drained and, therefore, the potential for groundwater contamination existed. Based on the potential for PCB contamination of soil, surface water, and groundwater, Site 9 was recommended for a confirmation study.

1986 Confirmation Study and 1991 Remedial Investigation Interim Report

A *Confirmation Study Step 1A (Verification), Round One* was conducted by Dames & Moore in 1986. Thirteen surface soil samples were collected from the site, nine from within the fenced perimeter near building CAD 16 and four from outside the fence along drainage pathways leading away from the site (**Figure 4-2**).

These surface soil samples were analyzed for PCB isomers and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The only PCB isomer detected was Aroclor-1260, and TCDD was not detected. Based on these results, it was concluded that the results for offsite samples CA9S12 (321 parts per billion [ppb]) and CA9S13 (82 ppb) suggested that offsite migration of contamination had occurred. All detections were below the Toxic Substances Control Act (TSCA) action level of 1 part per million. This action level is defined in 40 CFR Part 761.61 as the lowest action level for the cleanup of PCBs in soils (specified for soils in high occupancy areas) (Baker, 1999a). Therefore, no additional sampling or actions were recommended due to the low levels of the detections. No evaluation of soil data relative to ecological screening values was conducted as part of this study.

These results were summarized in the *Confirmation Study Step 1A (Verification), Round One* Report (Dames & Moore, 1986) and the *Remedial Investigation Interim Report* (Dames & Moore, 1991) and are evaluated as part of this SI Report.

1999 No Further Response Action Planned

Based on the results presented in the *Confirmation Study Step 1A (Verification), Round One* Report and the *Remedial Investigation Interim Report*, a *Draft Final No Further Response Action Planned Decision Document Site 9 - Transformer Storage Area* (Baker, 1999b) was provided for regulatory review in December 1999. A Human Health Risk Assessment (HHRA) was included in this decision document that considered the 1986 PCB soil data. Current onsite workers and future adult and child residents were evaluated for carcinogenic risks associated with ingestion, dermal contact and inhalation exposure to soils containing PCBs. The results of this assessment indicated there were no unacceptable human health risks associated with PCBs in soil.

On March 28, 2000, the USEPA Region 3 submitted comments on the *Draft Final No Further Response Action Planned Decision Document Site 9 – Transformer Storage Area* stating that they were concerned with the results of the HHRA since the depths of the 1986 soil samples were unknown and a SERA was recommended prior to moving forward with the no action decision document.

Screening Ecological Risk Assessment

A SERA was completed using the 1986 soil data. To address the ecological risks from the potential PCB release, the soil data were compared to surface soil screening values and were used to estimate dietary intakes using food web exposure models. Surface water runoff was found to be a significant transport pathway for chemical migration to down-gradient surface soil, surface water, and groundwater. Since these transport pathways could not be evaluated with the available data for Site 9, a CSM was created to address this gap.

Results of the SERA were presented in the *Screening Level Ecological Risk Assessment Report of Sites 4 and 9* (Baker, 2005a) and indicated a potentially unacceptable risk existed for terrestrial plants, invertebrates, and upper trophic level receptors from PCBs in soil. This determination was based on the levels of Aroclor-1260 exceeding 100 ppb, the 1995 USEPA Region 3 BTAG screening level used to complete of the SERA. The SERA recommended further ecological evaluation of the site.

2009 Site Inspection Activities

Site 9 investigation activities included surface and subsurface soil sampling, groundwater well point installation, groundwater development and sampling, well point abandonment, and sediment sampling. An explanation for each activity and methods of sample collection are documented in Section 2, Investigation Methodology.

4.2.2 Physical Setting

Topography and Surface Water

Site 9 is approximately 900 feet east and upgradient of Cheatham Pond and approximately 2,500 feet west-southwest of the York River. Site 9 is situated adjacent to the northwest corner of building CAD 16 and covers approximately 7,000 square feet (Dames & Moore, 1991). The topography is relatively flat with the western part of the site draining west toward B Street and the eastern part of the site draining northeast towards a storm drain (**Figure 4-2**).

Runoff at the site flows west towards B Street to the grassy drainage ditch along the western side of B Street, which flows to the south. Surface water that flows northeast into the storm drain will discharge at Outfall 2 (located near Site 4) and flow as surface water in two unnamed drainage ditches through Site 4 and into the Upstream Pond (**Figure 1-2**). Surface water in Upstream Pond flows through a culvert under D Street into Youth Pond and eventually discharges into the York River. The spatial relationship of this site to Site 4 and AOC 3, as well as the presumed directions of groundwater and surface water flow, are illustrated in the CSM (**Figure 3-1**) while site-specific information is illustrated in **Figure 4-1**.

Hydrogeology

In general, soil at Site 9 is predominately yellowish-brown sandy clay and clay underlain by greenish-grey silty sand. Soil boring logs from the SI field activities present descriptions of the soil and general subsurface geology and are included as **Appendix E**.

The first encountered groundwater beneath the site is the Yorktown Eastover Aquifer. Groundwater depths during the SI field activities ranged from approximately 7.5 to 8.5 feet bgs. Groundwater on the eastern side of the groundwater divide is estimated to flow north-northeast towards Upstream Pond while groundwater on the eastern side of the groundwater divide is estimated to flow south-southwest towards Cheatham Pond.

Current and Future Land Use

Site 9 is currently a gravel area with limited grass cover. Site 9 is located within the CAD area, which is restricted to general CAX visitors (e.g., civilian employees and military personnel). Future land use at Site 9 is not expected to change and will likely continue as a gravel area in the foreseeable future.

4.2.3 Distribution of Contamination

Data collected during the 1986 Confirmation Study and the 2009 SI field activities were evaluated as part of this SI Report (**Figure 4-2**). **Tables 4-1** through **Table 4-5** summarize all constituents detected in Site 9 soil, groundwater, and sediment. The tables also identify screening criteria exceedances. All analytical data for the SI samples are provided in **Appendix I**.

Soil

In total, 18 surface soil and 5 subsurface soil samples were collected from Site 9 (**Table 2-1**) during the 1986 Confirmation Study (CAS009-9S01 through CAS009-9S13 [surface soil]) and the 2009 SI field activities (CAS04 CAS09-SS/SB01 through CAS09-SS/SB05). Sample locations were chosen in and around the known boundary of formerly stored transformers at Site 9. These locations were chosen to best represent Site 9 soil with the highest probability of contaminant impact as well as to fill any analytical data gaps from historical data.

Soil samples from the 1986 Confirmation Study were analyzed for PCB isomers and TCDD Soil samples collected during the 2009 SI field activities were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, TAL total metals, cyanide, TOC, pH, and grain size.

Volatile Organic Compounds

One VOC (methylene chloride) exceeded at least one screening criterion in surface and subsurface soil samples (**Figures 4-3** and **4-4**). However, methylene chloride is a common laboratory contaminant, and the low level concentrations suggest that it is not likely site-related.

Semivolatile Organic Compounds

Three SVOCs (benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene) exceeded at least one screening criterion in surface soil samples (**Figure 4-3**). Two SVOCs (benzo(a)pyrene and dibenz(a,h)anthracene) exceeded at least one screening criterion in subsurface soil samples (**Figure 4-4**).

In surface and subsurface soil samples, the only SVOC to exceed multiple screening criteria (background, RSLs, and SSLs) was benzo(a)pyrene in surface soil sample CAS04-SS02 at a concentration of 39 μg/kg. All other SVOCs only exceeded their respective SSLs. However aside from benzo(a)anthracene and benzo(a)pyrene, none of these constituents were detected in groundwater at the site.

Pesticides/Polychlorinated Biphenyls

Four pesticides (dieldrin, Endosulfan II, endosulfan sulfate, and gamma-BHC [Lindane]) exceeded at least one screening criterion in surface soil samples (**Figure 4-3**). Two pesticides (dieldrin and endosulfan sulfate) exceeded at least one screening criterion in subsurface soil samples (**Figure 4-4**). Pesticides were not known to be disposed of at Site 9. The low detected concentrations are likely attributable to normal pesticide use at DoD facilities to control pests and weeds. The legal application of pesticides is not a CERCLA-regulated release.

One PCB, Aroclor-1260, exceeded multiple screening criteria (background, RSLs, and SSLs) in two surface soil samples, CAS009-9S12 and CAS09-SS02, at maximum concentrations of 321 µg/kg and 760 µg/kg, respectively (**Figure 4-3**). The residential RSL for Aroclor-1260 is 220 µg/kg.

Aroclor-1260 concentrations exceeded the SSL in two subsurface soil samples, CAS09-SB02 and CAS09-SB05, at concentrations of 41 µg/kg and 100 µg/kg, respectively (**Figure 4-4**). However, Aroclor-1260 was not detected in groundwater at the site.

Dioxins/Furans

TCDD was not detected in any surface soil sample.

Inorganic Constituents

Four inorganics (aluminum, chromium, copper, and nickel) exceeded at least one screening criterion in surface soil samples (**Figure 4-3**). Five inorganics (aluminum, arsenic, chromium, copper, and vanadium) exceeded at least one screening criterion in subsurface soil samples (**Figure 4-4**).

Aluminum exceeded the residential RSL (12,200 mg/kg) in one surface soil sample, CAS09-SS05, at a concentration of 12,900 mg/kg. Chromium was detected above the residential RSL (0.29 mg/kg) and SSL (0.00083 mg/kg) in two surface soil samples, CAS09-SS02 and CAX09-SS05, at concentrations of 18.5 mg/kg and 18.7 mg/kg, respectively. Copper exceeded the ecological screening criteria (70.0 mg/kg), residential RSL (310 mg/kg), and the SSL (51 mg/kg) in one surface soil sample, CAS09-SS02, at a concentration of 512 mg/kg. Nickel exceeded the ecological screening criteria (38.0 mg/kg) in one surface soil sample, CAS09-SS02, at a concentration of 44.8 mg/kg.

The most detected inorganic, aluminum, exceeded the residential RSL (7,700 mg/kg) in three subsurface soil samples, CAS09-SB01, CAS09-SB02, and CAS09-SB05, at concentrations of 27,300 mg/kg, 18,900 mg/kg, and 17,600 mg/kg, respectively.

Groundwater

Groundwater samples were collected from four temporary monitoring wells (CAS09-GW01 through CAS09-GW04) during the 2009 SI field activities. Since no groundwater samples had previously been collected from Site 9, the sample locations were chosen to best represent groundwater conditions directly beneath the former transformer storage area as well as the areas downgradient of the site. Since there is a groundwater divide at this site as shown on the CSM for Site 9, wells were installed and samples collected on either side of this divide to ensure adequate representation of potential groundwater moving under and from this site.

All groundwater samples were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, and TAL total and dissolved metals, mercury, and cyanide.

Volatile Organic Compounds
No VOCs were detected in groundwater samples.

Semivolatile Organic Compounds
Two SVOCs, benzo(a)anthracene and benzo(a)pyrene, exceeded at least one screening criterion in groundwater samples (**Figure 4-5**).

- Benzo(a)anthracene was detected in one monitoring well (CAS09-GW03) at a concentration of 0.16J µg/L, above the tapwater RSL of 0.029 µg/L.
- Benzo(a)pyrene was detected in one monitoring well (CAS09-GW03) at a concentration of 0.11J µg/L, above the tapwater RSL of 0.0029 µg/L, but below the MCL of 0.2 µg/L.

Pesticides/Polychlorinated Biphenyls
No pesticides exceeded screening criteria (**Table 4-3**).

No PCBs were detected in groundwater samples.

Inorganic Constituents
Total iron, total manganese and dissolved manganese exceeded at least one screening criterion in groundwater samples (**Figure 4-5**).

The maximum concentrations of total manganese (113 µg/L) and dissolved manganese (93.9 µg/L) were only slightly higher than their respective background concentrations of 57.9 µg/L, and 49.5 µg/L and are likely attributable to background conditions. In addition, although total iron concentrations (5,050 µg/L) exceeded the adjusted Tapwater RSL of 2,600 µg/L, it did not exceed any screening criteria in the dissolved fraction.

Surface Water

Due to lack of standing water in the drainage ditches at Site 9, no surface water samples were collected at this site.

Sediment

Three surface and subsurface sediment samples were collected from Site 9 (**Table 2-1**) during the 2009 SI field activities (CAS09-SD01, CAS09-SD02, and CAS09-SD03). Surface sediment sample locations were collected from 0-4 inches bgs and subsurface sediment sample locations were collected from 4-8 inches bgs. Sample locations were placed within the drainage channel that is located downstream from Site 9 in order to best represent potential impacts of transported contaminants from Site 9.

All sediment samples were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, TAL total metals, cyanide, TOC, pH, and grain size.

Volatile Organic Compounds
One VOC, PCE, was detected in surface and subsurface sediment, but at concentrations below screening criteria (**Tables 4-4** and **4-5**).

Semivolatile Organic Compounds
Five SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene) exceeded at least one screening criterion in surface sediment samples

(**Figure 4-6**). No SVOCs were detected in subsurface sediment at concentrations exceeding the screening criteria.

The five SVOCs exceeding their respective adjusted residential RSLs were detected in one surface sediment sample (CAS09-SD01). However these SVOCs did not exceed their respective screening criterion in the closest downgradient sediment sample nor in any subsurface sediment samples.

Benzo(a)pyrene was detected in surface sediment sample CAS09-SD03; however, the detected concentration (19J µg/kg) was just slightly higher than the adjusted residential RSL (15 µg/kg).

Pesticides/Polychlorinated Biphenyls

Six pesticides (4-4′-DDT, dieldrin, endosulfan II, endosulfan sulfate, endrin ketone, and gamma-chlordane) exceeded at least one screening criterion in surface sediment samples (**Figure 4-6**). Four pesticides (4-4′-DDT, endosulfan II, endosulfan sulfate, and gamma-chlordane) exceeded at least one screening criterion in subsurface sediment samples (**Figure 4-7**).

Pesticides were not known to be disposed of at Site 9. Detected concentrations are likely attributable to normal pesticide use at DoD facilities to control pests and weeds. The legal application of pesticides is not a CERCLA-regulated release.

One PCB (Aroclor-1260) was detected in surface and subsurface sediment samples at concentrations exceeding one or more screening criterion (**Tables 4-4** and **4-5** and **Figures 4-6** and **4-7**). Aroclor-1260 was detected in all surface sediment samples at a maximum concentration of 9,700 µg/kg in CAS09-SD01. The adjusted residential RSL for Aroclor-1260 is 220 µg/kg.

Aroclor-1260 was detected in all subsurface sediment samples at a maximum concentration of 1,700J µg/kg in CAX09-SD02.

Inorganic Constituents

Seven inorganics (aluminum, arsenic, chromium, cobalt, iron, mercury, selenium, and vanadium) exceeded at least one screening criterion in surface sediment samples (**Figure 4-6**). Six inorganics (aluminum, arsenic**,** chromium, cobalt, iron, mercury, and vanadium) exceeded at least one screening criterion in subsurface sediment samples (**Figure 4-7**).

The most detected inorganics, aluminum, arsenic, chromium, cobalt, and iron, exceeded their respective screening criteria in all three surface sediment samples.

The most detected inorganics, aluminum, arsenic, chromium, and iron, exceeded their respective adjusted residential RSLs in all three subsurface sediment samples.

4.2.4 Potential Exposure and Receptor Pathways

Potential receptors at Site 9 include current/potential future industrial workers, current/potential future trespassers, potential future construction workers, potential future residents, soil invertebrates and terrestrial plants.

Human Health Risk Evaluation

The human health risk screening/risk-ratio evaluation for Site 9 is presented in **Appendix A**. The supporting tables for the evaluation are presented in **Appendix A, Attachment A.2**. An overview of the potential receptors and exposure pathways addressed in the risk evaluation is presented in **Figure A-1** of **Appendix A**. The results of the evaluation for Site 9 are summarized below.

Surface Soil

The risk-based screening/risk ratio evaluation for surface soil at Site 9 is provided in **Appendix A, Attachment A.2, Tables 2.1** through **2.1b**.

In Step 1, five constituents were detected in surface soil samples above background and the human health screening levels, and were selected as COPCs: benzo(a)pyrene, Aroclor-1260, aluminum, chromium, and copper.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 7×10^{-5} was calculated; this value greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene, Aroclor-1260, and chromium. Cumulative target organ HIs calculated for the COPCs were 0.2; these HI values were less than the cumulative target organ HI risk-ratio screening benchmark of 0.5.

In Step 3, based on the use of the 95 percent UCL for the EPC, a cumulative cancer risk of 7×10^{-5} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Benzo(a)pyrene, Aroclor-1260, and chromium contributed to the cumulative cancer risk; however, chromium was the only COPC to contribute an individual cancer risk above $5x10^{-5}$.

Exposure to surface soil at Site 9 may result in unacceptable human health risks associated with chromium, based on potential human exposure. However, in performing the risk assessment, it was assumed that all of the chromium detected in the soil is in the hexavalent form, which is very unlikely. Chromium is generally found in natural soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, trivalent chromium is the form of chromium expected to be present at the site. Chromium was identified as a COPC in soil when screened against the respective RSLs for hexavalent chromium. However, the maximum detected concentration for chromium in soil was less than the RSL for trivalent chromium. Therefore, it is likely there would be no unacceptable carcinogenic risk associated with exposure to the surface soil at Site 9.

Subsurface Soil

The risk-based screening/risk ratio evaluation for subsurface soil at Site 9 is provided in **Appendix A, Attachment A.2, Tables 2.2** through **2.2b**.

In Step 1, four constituents were detected in subsurface soil samples above background and the human health screening levels, and were identified as COPCs: aluminum, arsenic, chromium, and vanadium.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 2×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs of 0.1 and 0.4 were calculated for the COPCs; these HI values were less than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: arsenic and chromium.

In Step 3, based on the 95 percent UCL for the EPC, a cumulative cancer risk of 1×10^{-4} was calculated; this value was greater than the 5×10^{-5} risk-ratio screening benchmark. Arsenic and chromium contributed to the cumulative cancer risk; however, chromium was the only COPC to contribute an individual cancer risk above $5x10^{-5}$.

Exposure to subsurface soil at Site 9 may result in unacceptable human health risks associated with chromium, based on potential human exposure However, in performing the risk assessment, it was assumed that all of the chromium detected in the soil is in the hexavalent form, which is very unlikely. Chromium is generally found in natural soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, trivalent chromium is the form of chromium expected to be present at the site. Chromium was identified as a COPC in soil when screened against the respective RSLs for hexavalent chromium. However, the maximum detected concentration for chromium in soil was less than the RSL for trivalent chromium. Therefore, it is likely there would be no unacceptable carcinogenic risk associated with exposure to the subsurface soil.

Groundwater

The risk-based screening/risk ratio evaluation for groundwater at Site 9 is provided in **Appendix A, Attachment A.2, Tables 2.5** and **2.5a**.

In Step 1, four constituents were detected in groundwater samples above background and the human health screening levels, and were identified as COPCs: benzo(a)anthracene, benzo(a)pyrene, iron, and manganese.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 4×10^{-5} was calculated; this value is less than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs were 0.1 and 0.2; these HI values were less than the cumulative target organ HI risk-ratio screening benchmark of 0.5. No constituents were identified as COPCs.

Exposure to groundwater at Site 9 would not be expected to result in any unacceptable human health risks based on potential human exposure and risk.

Sediment (Drainage Ditches)

The risk-based screening/risk ratio evaluation for surface and subsurface sediment in the drainage ditches at Site 9 is provided in **Appendix A, Attachment A.2, Tables 2.3** through **2.4a**. Sediment at Site 9 is dry most of the year; therefore, it was treated as if it was soil and was screened against the screening criteria established for soil.

In Step 1, twelve constituents were detected in surface sediment (0-4 inches) above the human health screening levels, and were identified as COPCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1260, dieldrin, aluminum, arsenic, chromium, iron, and vanadium.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 2×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs ranged from 0.1 to 0.5; these HI values do not exceed the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1260, dieldrin, arsenic, and chromium.

A minimum of five samples is needed to conduct Step 3 (risk ratio using 95 percent UCLs) of the evaluation; therefore, this step was not conducted because only three surface sediment samples were collected at the site.

It was concluded that exposure to surface sediment at Site 9 may result in unacceptable human health risks associated with PAHs, pesticides/PCBs, and metals, based on potential human exposure.

In Step 1, six constituents were detected in subsurface sediment (4 to 8 inches) above the human health screening levels, and were identified as COPCs: Aroclor-1260, aluminum, arsenic, chromium, iron, and vanadium.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 2×10^{-4} was calculated; this value greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs ranged from 0.2 to 0.6; one HI value was greater than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk or a cumulative target organ HI greater than 0.5 were identified as COPCs, and included: Aroclor-1260, arsenic, chromium, and iron. Chromium was the only COPC to contribute an individual cancer risk above 5×10^{-5}.

A minimum of five samples is needed to conduct Step 3 (risk ratio using 95 percent UCLs) of the evaluation; therefore, this step was not conducted because only three surface sediment samples were collected at the site.

Thallium did not have any available screening criteria; potential risks associated with this constituent could not be evaluated.

It was concluded that exposure to subsurface sediment at Site 9 may result in unacceptable human health risks associated with Aroclor-1260, arsenic, chromium, and iron, based on potential human exposure. The potential unacceptable carcinogenic risk is primarily associated with chromium, the only COPC to contribute to a risk above the screening benchmark level. However, in performing the risk assessment, it was assumed that all of the chromium detected in the subsurface sediment is in the hexavalent form, which is very unlikely. Chromium is generally found in natural sediment in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, trivalent chromium is the form of chromium expected to be present at the site. Chromium was identified as a COPC in subsurface sediment when screened against the respective RSLs for hexavalent chromium. However, the maximum detected concentration for chromium in subsurface sediment was less than the RSL for trivalent chromium. Iron, the only contributor to the potential noncarcinogenic hazard is considered an essential human nutrient, and although the concentrations indicate a potential unacceptable hazard, it is likely that exposure to iron at the concentrations present on site would not result in any adverse health effects. Therefore, it is likely there would be no unacceptable carcinogenic risk or noncarcinogenic hazard associated with exposure to the subsurface sediment in the drainage ditches at Site 9.

Ecological Risk Evaluation

The ecological risk screening was performed to determine the potential for ecological risks associated with direct exposure to site media at Site 9 surface and subsurface soils. Separate screenings were conducted for the site and the adjacent drainage ditch. The results of the ecological risk screening (**Appendix B**) provide a preliminary indication of potential risks from exposure to COPCs identified for the site, and are used to help determine whether the site requires further evaluation or if the risks are acceptable. **Table B-4** lists the samples used in this evaluation and the spatial groupings.

Surface Soil (Site)

Four metals (copper, iron, manganese, and nickel) and three pesticides (dieldrin, endosulfan II, and endosulfan sulfate) exceeded screening values based upon maximum detected concentrations (**Tables B-34** and **B-35**). All of these constituents, except iron and manganese, also exceeded background UTLs, where available. Acetone and carbazole lacked both screening values and background UTLs. Therefore, copper, nickel, dieldrin, endosulfan II, endosulfan sulfate, acetone, and carbazole were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (140 µg/kg) that was less than soil screening values for other, similar VOCs (**Table B-1**). Therefore, this chemical was not identified as a refined COPC.

- Carbazole was detected in one surface soil sample at a maximum concentration of 2.70 µg/kg (0.0027 mg/kg). While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentrations of this chemical are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg. The maximum concentration of carbazole (0.0027 mg/kg) is below this effects concentration. Therefore, carbazole was not identified as a refined COPC.

- The mean HQs for nickel, dieldrin, and endosulfan II were less than one. Therefore, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for copper (1.74) and endosulfan sulfate (1.48). These two chemicals were identified as refined COPCs.

Subsurface Soil (Site)

One metal (copper) and one pesticide (endosulfan sulfate) exceeded screening values based upon maximum detected concentrations (**Tables B-36** and **B-37**). These chemicals also exceeded background UTLs, where available. A screening value and background UTL were not available for acetone. Therefore, copper, endosulfan sulfate, and acetone were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (93.0 µg/kg) that was less than soil screening values for other, similar VOCs (**Table B-1**). Therefore, this chemical was not identified as a refined COPC.
- The mean HQs for copper and endosulfan sulfate were less than one. Therefore, these two chemicals were not identified as refined COPCs.

No refined COPCs were identified for this medium and risks from this exposure pathway are considered acceptable.

Surface Sediment (Drainage Ditches)

Two metals (mercury and selenium), six pesticides (4,4′-DDT, dieldrin, endosulfan II, endosulfan sulfate, endrin ketone, and gamma-chlordane), and Aroclor-1260 exceeded screening values based upon maximum detected concentrations (**Tables B-38** and **B-39**). All of these chemicals also exceeded background UTLs, where available. Carbazole lacked both screening values and background UTLs. Therefore, mercury, selenium, 4,4′-DDT, dieldrin, endosulfan II, endosulfan sulfate, endrin ketone, gamma-chlordane, Aroclor-1260, and carbazole were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- Carbazole was detected in one surface soil sample at a maximum concentration of 52.0 µg/kg (0.052 mg/kg). While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentrations of this chemical are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg. The maximum concentration of carbazole (0.052 mg/kg) is below this effects concentration. Therefore, carbazole was not identified as a refined COPC.
- Although the mean HQ for Aroclor-1260 was less than one, this chemical was identified as a refined COPC because concentrations were higher in more recent samples and because concentrations were only just below screening values in the most downgradient sample.

- The mean HQ exceeded one for mercury (1.70), selenium (1.19), 4,4′-DDT (4.65), dieldrin (4.73), endosulfan II (9.26), endosulfan sulfate (30.1), endrin ketone (107), and gamma-chlordane (4.04). These eight chemicals were identified as refined COPCs.

Subsurface Sediment (Drainage Ditches)

Two metals (mercury and selenium) and four pesticides (4,4′-DDT, endosulfan II, endosulfan sulfate, and gamma-chlordane) exceeded screening values based upon maximum detected concentrations (**Tables B-40** and **B-41**). All of these chemicals, except selenium, also exceeded background UTLs, where available. Therefore, mercury, 4,4′-DDT, endosulfan II, endosulfan sulfate, and gamma-chlordane were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- The mean HQs for mercury, 4,4′-DDT, and gamma-chlordane were less than one. Therefore, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for endosulfan II (1.72) and endosulfan sulfate (2.01). These two chemicals were identified as refined COPCs.

4.3 Site 9 Release Assessment Decision Analysis

This subsection discusses the sample results in the context of the Data Evaluation Diagram (**Figure 1-2**), and is also summarized in **Table 4-6**.

Step 1—Determination of Potential CERCLA Eligibility and if CERCLA-eligible, has a CERCLA-regulated release occurred at the site?

Historical information indicates that transformers were stored at the site between 1973 and 1980 on unpaved, exposed soil. There is the potential that spills from the PCB-containing transformers occurred; however, there are no reports of releases from the transformers during storage.

Because Site 9 was listed as an SSA within the FFA as a site that “may pose a threat, or potential threat, to human health and the environment”, and because VOCs, SVOCs, pesticides, PCBs, and inorganic constituents were observed above background levels during the SI, it is considered to be CERCLA-eligible. Site 9 is further evaluated in the decision analysis process in Step 2a.

Step 2—Does the CERCLA release pose potential unacceptable risks to human health and the environment?

Step 2a - Comparison of Data Against Conservative Risk-Based Screening Values

In summary, one VOC (methylene chloride), three SVOCs (benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene), four pesticides (dieldrin, Endosulfan II, endosulfan sulfate, and gamma-BHC [Lindane]), one PCB (Aroclor-1260), and four metals (aluminum, chromium, copper, and nickel) exceeded one or more screening criteria in surface soil samples and one VOC (methylene chloride), two SVOCs (benzo(a)pyrene and dibenz(a,h)anthracene), two pesticides (dieldrin and endosulfan sulfate), one PCB (Aroclor-1260), and five metals(aluminum, arsenic, chromium, copper, and vanadium) exceeded one or more screening criteria in subsurface soil samples.

In groundwater collected from Site 9, two SVOCs (benzo(a)anthracene and benzo(a)pyrene), and two metals (total iron and total and dissolved manganese) exceeded one or more screening criteria.

In the Site 9 drainage ditches, five SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene), six pesticides (4-4′-DDT, dieldrin, endosulfan II, endosulfan sulfate, endrin ketone, and gamma-chlordane), one PCB (Aroclor-1260), and seven inorganics (aluminum, arsenic, chromium, cobalt, iron, mercury, selenium, and vanadium) exceeded at least one screening criterion in surface sediment and four pesticides (4-4′-DDT, endosulfan II, endosulfan sulfate, and gamma-chlordane), one PCB (Aroclor-1260), and six inorganics (aluminum, arsenic, chromium, cobalt, iron, mercury, and vanadium) exceeded at least one screening criterion in subsurface sediment.

Step 2b—Conduct a Semi-quantitative Risk Evaluation Using More-Realistic Assumptions

Human Health Risk Evaluation

Exposure to surface and subsurface soil at Site 9 may result in unacceptable human health risks associated with chromium, based on potential human exposure. However, in performing the risk assessment, it was assumed that all of the chromium detected in the soil is in the hexavalent form, which is very unlikely. Chromium is generally found in natural soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, trivalent chromium is the form of chromium expected to be present at the site. Chromium was identified as a COPC in soil when screened against the respective RSLs for hexavalent chromium. However, the maximum detected concentration for chromium in soil was less than the RSL for trivalent chromium. Therefore, it is likely there would be no unacceptable carcinogenic risk associated with exposure to the surface and subsurface soil at Site 9.

Exposure to groundwater at Site 9 would not be expected to result in any unacceptable human health risks based on potential human exposure and risk.

Exposure to surface sediment at Site 9 may result in unacceptable human health risks associated with PAHs, pesticides/PCBs, and metals, based on potential human exposure.

Exposure to subsurface sediment at Site 9 may result in unacceptable human health risks associated with Aroclor-1260, arsenic, chromium, and iron, based on potential human exposure. The potential unacceptable carcinogenic risk is primarily associated with chromium, the only COPC to contribute to a risk above the screening benchmark level. It was assumed that all of the chromium detected in the subsurface sediment is in the hexavalent form, which is very unlikely. Iron, the only contributor to the potential noncariconogenic hazard is considered an essential human nutrient, and although the concentrations indicate a potential unacceptable hazard, it is likely that exposure to iron at the concentrations present on site would not results in any adverse health effects. Therefore, it is likely there would be no unacceptable carcinogenic risk or noncarcinogenic hazard associated with exposure to the subsurface sediment in the drainage ditches at Site 9.

Ecological Risk Evaluation

Potential unacceptable ecological risks were identified with exposure to surface soil attributable to endosulfan sulfate and copper. No potential unacceptable ecological risks were identified with exposure to subsurface soil. In the Site 9 drainage ditches, potential unacceptable ecological risks were identified with exposure to surface sediment attributable to 4,4′-DDT, Aroclor-1260, dieldrin, endosulfan II, endosulfan sulfate, endrin ketone, gamma-chloradane, mercury and selenium. Potential unacceptable ecological risks were identified with exposure to subsurface sediment attributable to endosulfan II and endosulfan sulfate.

Step 3—Is further Investigation or Action Required?

Results from this SI Report indicate that the nature and extent of contamination in surface soil, subsurface soil, and groundwater have been sufficiently characterized. However, additional site characterization for sediment will be needed.

Due to the small size of the site and the extent of contamination, an expanded SI is recommended to further characterize the extent of contamination in sediment and an interim removal action is recommended to mitigate COPCs in surface soil and sediment. Confirmation sampling would be conducted following the interim removal action. Information regarding the number of samples, sampling locations, sampling analytes, and how the sample data will be used in the expanded SI will be agreed to by the CAX Partnering Team and documented in an expanded SI UFP-SAP, to be submitted under separate cover.

TABLE 4-1
Site 9 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS009-9S01	CAS009-9S02	CAS009-9S03	CAS009-9S04	CAS009-9S05	CAS009-9S06
Sample ID					CAS009-9S01-00-1286	CAS009-9S02-00-1286	CAS009-9S03-00-1286	CAS009-9S04-00-1286	CAS009-9S05-00-1286	CAS009-9S06-00-1286
Sample Date					12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Depth					Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Chemical Name										
Volatile Organic Compounds (UG/KG)										
Acetone	--	--	6,100,000	4,500	NA	NA	NA	NA	NA	NA
Methylene chloride	--	1,250	11,000	1.2	NA	NA	NA	NA	NA	NA
Toluene	--	40,000	500,000	1,600	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/KG)										
Acenaphthene	--	LMW PAH	340,000	22,000	NA	NA	NA	NA	NA	NA
Acenaphthylene	--	LMW PAH	340,000	22,000	NA	NA	NA	NA	NA	NA
Anthracene	--	LMW PAH	1,700,000	360,000	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	--	HMW PAH	150	10	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	--	HMW PAH	15	3.5	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	--	HMW PAH	150	35	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	NA	NA	NA	NA	NA	NA
Carbazole	--	--	--	--	NA	NA	NA	NA	NA	NA
Chrysene	--	HMW PAH	15,000	1,100	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	--	HMW PAH	15	11	NA	NA	NA	NA	NA	NA
Fluoranthene	--	LMW PAH	230,000	160,000	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	NA	NA	NA	NA	NA	NA
PAH (HMW)	--	18,000	--	--	NA	NA	NA	NA	NA	NA
PAH (LMW)	--	29,000	--	--	NA	NA	NA	NA	NA	NA
Phenanthrene	--	LMW PAH	1,700,000	360,000	NA	NA	NA	NA	NA	NA
Pyrene	--	HMW PAH	170,000	120,000	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	--	583	2,000	66	NA	NA	NA	NA	NA	NA
4,4'-DDE	--	114	1,400	47	NA	NA	NA	NA	NA	NA
4,4'-DDT	--	100	1,700	67	NA	NA	NA	NA	NA	NA
alpha-Chlordane	--	11.0	1,600	13	NA	NA	NA	NA	NA	NA
Aroclor-1260	--	8,000	220	24	10 U	10 U	10 U	**41**	**35**	**22**
Dieldrin	--	10.5	30	0.17	NA	NA	NA	NA	NA	NA
Endosulfan I	--	6.32	37,000	3,000	NA	NA	NA	NA	NA	NA
Endosulfan II	--	6.32	37,000	3,000	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	--	6.32	37,000	3,000	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	--	7.75	520	0.36	NA	NA	NA	NA	NA	NA
gamma-Chlordane	--	11.0	1,600	13	NA	NA	NA	NA	NA	NA
Dioxin/Furans (PG/G)										
No Detections					NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)										
Aluminum	12,200	pH < 5.5	7,700	55,000	NA	NA	NA	NA	NA	NA
Antimony	11	78.0	3.1	0.66	NA	NA	NA	NA	NA	NA
Arsenic	6.36	18.0	0.39	0.0013	NA	NA	NA	NA	NA	NA
Barium	52.9	330	1,500	300	NA	NA	NA	NA	NA	NA
Beryllium	0.587	40.0	16	58	NA	NA	NA	NA	NA	NA
Cadmium	1.5	32.0	7	1.4	NA	NA	NA	NA	NA	NA
Calcium	2,290	--	--	--	NA	NA	NA	NA	NA	NA
Chromium	18.2	64.0	0.29	8.30E-04	NA	NA	NA	NA	NA	NA
Cobalt	9.93	13.0	2.3	0.49	NA	NA	NA	NA	NA	NA
Copper	4.25	70.0	310	51	NA	NA	NA	NA	NA	NA
Cyanide	--	15.8	160	7.4	NA	NA	NA	NA	NA	NA
Iron	19,900	5 < pH > 8	5,500	640	NA	NA	NA	NA	NA	NA
Lead	17.4	120	400	--	NA	NA	NA	NA	NA	NA

TABLE 4-1
Site 9 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS009-9S01	CAS009-9S02	CAS009-9S03	CAS009-9S04	CAS009-9S05	CAS009-9S06
Sample ID					CAS009-9S01-00-1286	CAS009-9S02-00-1286	CAS009-9S03-00-1286	CAS009-9S04-00-1286	CAS009-9S05-00-1286	CAS009-9S06-00-1286
Sample Date					12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Depth					Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Chemical Name										
Total Metals (MG/KG)										
Magnesium	1,070	--	--	--	NA	NA	NA	NA	NA	NA
Manganese	324	220	180	57	NA	NA	NA	NA	NA	NA
Mercury	0.111	0.10	2.3	0.57	NA	NA	NA	NA	NA	NA
Nickel	9.52	38.0	150	48	NA	NA	NA	NA	NA	NA
Potassium	708	--	--	--	NA	NA	NA	NA	NA	NA
Selenium	0.51	0.52	39	0.95	NA	NA	NA	NA	NA	NA
Silver	2.1	560	39	1.6	NA	NA	NA	NA	NA	NA
Sodium	521	--	--	--	NA	NA	NA	NA	NA	NA
Vanadium	27.9	130	39	180	NA	NA	NA	NA	NA	NA
Zinc	26.5	120	2,300	680	NA	NA	NA	NA	NA	NA
Wet Chemistry										
pH (ph)	--	--	--	--	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC) (ug/g)	--	--	--	--	NA	NA	NA	NA	NA	NA
Grain Size (PCT/P)										
GS07 Sieve 1" (25.0 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	--	--	--	--	NA	NA	NA	NA	NA	NA

Notes:

Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeecds BKG, ECO, RSL & SSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PG/G - Picograms per gram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 4-1
Site 9 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS009-9S07	CAS009-9S08	CAS009-9S09	CAS009-9S10	CAS009-9S11	CAS009-9S12
Sample ID					CAS009-9S07-00-1286	CAS009-9S08-00-1286	CAS009-9S09-00-1286	CAS009-9S10-00-1286	CAS009-9S11-00-1286	CAS009-9S12-00-1286
Sample Date					12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Depth					Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Chemical Name										
Volatile Organic Compounds (UG/KG)										
Acetone	--	--	6,100,000	4,500	NA	NA	NA	NA	NA	NA
Methylene chloride	--	1,250	11,000	1.2	NA	NA	NA	NA	NA	NA
Toluene	--	40,000	500,000	1,600	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/KG)										
Acenaphthene	--	LMW PAH	340,000	22,000	NA	NA	NA	NA	NA	NA
Acenaphthylene	--	LMW PAH	340,000	22,000	NA	NA	NA	NA	NA	NA
Anthracene	--	LMW PAH	1,700,000	360,000	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	--	HMW PAH	150	10	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	--	HMW PAH	15	3.5	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	--	HMW PAH	150	35	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	NA	NA	NA	NA	NA	NA
Carbazole	--	--	--	--	NA	NA	NA	NA	NA	NA
Chrysene	--	HMW PAH	15,000	1,100	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	--	HMW PAH	15	11	NA	NA	NA	NA	NA	NA
Fluoranthene	--	LMW PAH	230,000	160,000	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	NA	NA	NA	NA	NA	NA
PAH (HMW)	--	18,000	--	--	NA	NA	NA	NA	NA	NA
PAH (LMW)	--	29,000	--	--	NA	NA	NA	NA	NA	NA
Phenanthrene	--	LMW PAH	1,700,000	360,000	NA	NA	NA	NA	NA	NA
Pyrene	--	HMW PAH	170,000	120,000	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	--	583	2,000	66	NA	NA	NA	NA	NA	NA
4,4'-DDE	--	114	1,400	47	NA	NA	NA	NA	NA	NA
4,4'-DDT	--	100	1,700	67	NA	NA	NA	NA	NA	NA
alpha-Chlordane	--	11.0	1,600	13	NA	NA	NA	NA	NA	NA
Aroclor-1260	--	8,000	220	24	10 U	10 U	**195**	**21**	**29**	**321**
Dieldrin	--	10.5	30	0.17	NA	NA	NA	NA	NA	NA
Endosulfan I	--	6.32	37,000	3,000	NA	NA	NA	NA	NA	NA
Endosulfan II	--	6.32	37,000	3,000	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	--	6.32	37,000	3,000	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	--	7.75	520	0.36	NA	NA	NA	NA	NA	NA
gamma-Chlordane	--	11.0	1,600	13	NA	NA	NA	NA	NA	NA
Dioxin/Furans (PG/G)										
No Detections					NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)										
Aluminum	12,200	pH < 5.5	7,700	55,000	NA	NA	NA	NA	NA	NA
Antimony	11	78.0	3.1	0.66	NA	NA	NA	NA	NA	NA
Arsenic	6.36	18.0	0.39	0.0013	NA	NA	NA	NA	NA	NA
Barium	52.9	330	1,500	300	NA	NA	NA	NA	NA	NA
Beryllium	0.587	40.0	16	58	NA	NA	NA	NA	NA	NA
Cadmium	1.5	32.0	7	1.4	NA	NA	NA	NA	NA	NA
Calcium	2,290	--	--	--	NA	NA	NA	NA	NA	NA
Chromium	18.2	64.0	0.29	8.30E-04	NA	NA	NA	NA	NA	NA
Cobalt	9.93	13.0	2.3	0.49	NA	NA	NA	NA	NA	NA
Copper	4.25	70.0	310	51	NA	NA	NA	NA	NA	NA
Cyanide	--	15.8	160	7.4	NA	NA	NA	NA	NA	NA
Iron	19,900	5 < pH > 8	5,500	640	NA	NA	NA	NA	NA	NA
Lead	17.4	120	400	--	NA	NA	NA	NA	NA	NA

TABLE 4-1
Site 9 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS009-9S07	CAS009-9S08	CAS009-9S09	CAS009-9S10	CAS009-9S11	CAS009-9S12
Sample ID					CAS009-9S07-00-1286	CAS009-9S08-00-1286	CAS009-9S09-00-1286	CAS009-9S10-00-1286	CAS009-9S11-00-1286	CAS009-9S12-00-1286
Sample Date					12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Depth					Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Chemical Name										
Total Metals (MG/KG)										
Magnesium	1,070	--	--	--	NA	NA	NA	NA	NA	NA
Manganese	324	220	180	57	NA	NA	NA	NA	NA	NA
Mercury	0.111	0.10	2.3	0.57	NA	NA	NA	NA	NA	NA
Nickel	9.52	38.0	150	48	NA	NA	NA	NA	NA	NA
Potassium	708	--	--	--	NA	NA	NA	NA	NA	NA
Selenium	0.51	0.52	39	0.95	NA	NA	NA	NA	NA	NA
Silver	2.1	560	39	1.6	NA	NA	NA	NA	NA	NA
Sodium	521	--	--	--	NA	NA	NA	NA	NA	NA
Vanadium	27.9	130	39	180	NA	NA	NA	NA	NA	NA
Zinc	26.5	120	2,300	680	NA	NA	NA	NA	NA	NA
Wet Chemistry										
pH (ph)	--	--	--	--	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC) (ug/g)	--	--	--	--	NA	NA	NA	NA	NA	NA
Grain Size (PCT/P)										
GS07 Sieve 1" (25.0 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	--	--	--	--	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	--	--	--	--	NA	NA	NA	NA	NA	NA

Notes:

Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeecds BKG, ECO, RSL & SSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PG/G - Picograms per gram
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UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 4-1
Site 9 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**CLEAN CAX BKG SS**	**ECO Risk**	**CLEAN RSLs Residential Soil Adjusted**	**CLEAN RSLs Risk-Based SSLs**	CAS009-9S13	CAS09-SS01	CAS09-SS02	CAS09-SS03	CAS09-SS04	CAS09-SS05	
Sample ID					CAS009-9S13-00-1286	CAS09-SS01-1009	CAS09-SS02-1109	CAS09-SS03-1109	CAS09-SS04-1109	CAS09-SS05-1109	CAS09-SS05P-1109
Sample Date					12/25/86	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Depth					Unknown	0-0.5"	0-0.5"	0-0.5"	0-0.5"	0-0.5"	0-0.5'
Chemical Name											
Volatile Organic Compounds (UG/KG)											
Acetone	--	--	6,100,000	4,500	NA	66 B	82 B	52 B	68 B	**140**	**100**
Methylene chloride	--	1,250	11,000	1.2	NA	24 UJ	**20 J**	**9 J**	27 UJ	**25 J**	**50**
Toluene	--	40,000	500,000	1,600	NA	**2 J**	4 UJ	5 U	5 UJ	5 U	5 U
Semivolatile Organic Compounds (UG/KG)											
Acenaphthene	--	LMW PAH	340,000	22,000	NA	20 U	**1.7 J**	21 U	22 U	22 U	21 U
Acenaphthylene	--	LMW PAH	340,000	22,000	NA	20 U	**1.2 J**	21 U	22 U	22 U	21 U
Anthracene	--	LMW PAH	1,700,000	360,000	NA	20 U	**6.5 J**	21 U	**2.1 J**	22 U	21 U
Benzo(a)anthracene	--	HMW PAH	150	10	NA	20 U	**40**	**3.4 J**	**12 J**	22 U	**4.4 J**
Benzo(a)pyrene	--	HMW PAH	15	3.5	NA	20 U	**39**	21 U	**8.1 J**	22 U	**3.9 J**
Benzo(b)fluoranthene	--	HMW PAH	150	35	NA	20 U	**61**	**5.5 J**	**18 J**	22 U	**7 J**
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	NA	20 U	**15 J**	21 U	**3.2 L**	22 U	**2.5 J**
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	NA	20 U	**24**	21 U	**6.9 J**	22 U	21 U
Carbazole	--	--	--	--	NA	20 U	**2.7 J**	21 U	22 U	22 U	21 U
Chrysene	--	HMW PAH	15,000	1,100	NA	20 U	**43**	**4.6 J**	**20 L**	22 U	**5.4 J**
Dibenz(a,h)anthracene	--	HMW PAH	15	11	NA	20 U	**5 J**	21 U	22 U	22 U	21 U
Fluoranthene	--	LMW PAH	230,000	160,000	NA	20 U	**81**	**7.1 J**	**60 L**	22 U	**9.2 J**
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	NA	20 U	**41**	**4 J**	**9.2 J**	22 U	**4.7 J**
PAH (HMW)	--	18,000	--	--	NA	90 U	**337**	**67**	**134**	99 U	**57.7**
PAH (LMW)	--	29,000	--	--	NA	90 U	**162**	**83.9**	**143**	99 U	**86.6**
Phenanthrene	--	LMW PAH	1,700,000	360,000	NA	20 U	**32**	**3.3 J**	**15 J**	22 U	**3.9 J**
Pyrene	--	HMW PAH	170,000	120,000	NA	20 U	**69**	**7.5 J**	**46 L**	22 U	**8.8 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)											
4,4'-DDD	--	583	2,000	66	NA	3.5 U	3.3 U	**6.7 J**	3.6 U	3.5 U	3.1 U
4,4'-DDE	--	114	1,400	47	NA	0.65 B	**5.8 J**	2.1 B	1.6 B	3.5 U	1.5 B
4,4'-DDT	--	100	1,700	67	NA	3.5 U	**59 J**	**8 J**	**13**	0.9 B	3.1 U
alpha-Chlordane	--	11.0	1,600	13	NA	1.8 U	**0.48 J**	1.9 U	1.8 U	1.8 U	1.6 U
Aroclor-1260	--	8,000	220	24	**82**	**9.5 J**	**760**	**86**	**150**	19 U	**150**
Dieldrin	--	10.5	30	0.17	NA	3.5 U	**11 J**	3.6 U	**1.6 J**	3.5 U	3.1 U
Endosulfan I	--	6.32	37,000	3,000	NA	1.8 U	**1 J**	1.9 U	1.8 U	1.8 U	1.6 U
Endosulfan II	--	6.32	37,000	3,000	NA	3.5 U	**10 J**	**1.1 J**	**1.5 J**	3.5 U	**1.7 J**
Endosulfan sulfate	--	6.32	37,000	3,000	NA	3.5 U	**30 J**	**4.6 J**	**8.8 J**	3.5 U	3.1 U
gamma-BHC (Lindane)	--	7.75	520	0.36	NA	1.8 U	1.7 U	1.9 U	**0.63 J**	1.8 U	1.6 U
gamma-Chlordane	--	11.0	1,600	13	NA	1.8 U	**7.6 J**	1.9 U	**0.91 J**	1.8 U	**1.1 J**
Dioxin/Furans (PG/G)											
No Detections					NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)											
Aluminum	12,200	pH < 5.5	7,700	55,000	NA	**4,490**	**9,680**	**5,090**	**9,630**	**9,780**	**12,900**
Antimony	11	78.0	3.1	0.66	NA	**0.06 L**	**0.2 L**	**0.1 L**	**0.14 L**	**0.14 L**	**0.15 L**
Arsenic	6.36	18.0	0.39	0.0013	NA	**1.1**	**1.5**	**0.91**	**1.7**	**1.9**	**2.4**
Barium	52.9	330	1,500	300	NA	**26.3**	**33.7**	**22.5**	**96.6**	**49.5**	**48.2**
Beryllium	0.587	40.0	16	58	NA	**0.35 J**	**0.94**	**0.25 J**	**0.55**	**0.49**	**0.51**
Cadmium	1.5	32.0	7	1.4	NA	1 U	**1**	**0.2 J**	**0.28 J**	**0.03 J**	**0.02 J**
Calcium	2,290	--	--	--	NA	**536**	**5,520**	**539**	**3,470**	**1,590**	**1,900**
Chromium	18.2	64.0	0.29	8.30E-04	NA	**5.9 K**	**18.5 K**	**6.9 K**	**15.1 K**	**15.1 K**	**18.7 K**
Cobalt	9.93	13.0	2.3	0.49	NA	**1.7**	**4.3**	**1**	**3.4**	**2.7**	**2.8**
Copper	4.25	70.0	310	51	NA	**3.8 K**	**512 K**	**5.9 K**	**37.9 K**	**46.9 K**	**48.1 K**
Cyanide	--	15.8	160	7.4	NA	**0.28 J**	0.77 U	0.77 U	0.77 U	0.84 U	0.84 U
Iron	19,900	5 < pH > 8	5,500	640	NA	**4,770**	**13,700**	**4,450**	**11,000**	**11,000**	**11,800**
Lead	17.4	120	400	--	NA	**6 K**	**39 K**	**18.4 K**	**19.2 K**	**12.7 K**	**11.3 K**

TABLE 4-1
Site 9 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS009-9S13	CAS09-SS01	CAS09-SS02	CAS09-SS03	CAS09-SS04	CAS09-SS05	
Sample ID					CAS009-9S13-00-1286	CAS09-SS01-1009	CAS09-SS02-1109	CAS09-SS03-1109	CAS09-SS04-1109	CAS09-SS05-1109	CAS09-SS05P-1109
Sample Date					12/25/86	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Depth					Unknown	0-0.5"	0-0.5"	0-0.5"	0-0.5"	0-0.5"	0-0.5'
Chemical Name											
Total Metals (MG/KG)											
Magnesium	1,070	--	--	--	NA	**328 K**	**3,550 K**	**341 K**	**2,130 K**	**1,440 K**	**1,330 K**
Manganese	324	220	180	57	NA	**91.8 K**	**295 K**	**47.5 K**	**159 K**	**119 K**	**102 K**
Mercury	0.111	0.10	2.3	0.57	NA	0.033 U	**0.02 J**	**0.01 J**	**0.02 J**	**0.01 J**	**0.01 J**
Nickel	9.52	38.0	150	48	NA	**2.3 J**	**44.8 J**	**2.6 J**	**9 J**	**6 J**	**6.7 J**
Potassium	708	--	--	--	NA	**249 K**	**1,540 K**	**232 K**	**2,040 K**	**1,280 K**	**1,000 K**
Selenium	0.51	0.52	39	0.95	NA	**0.25 J**	**0.25 J**	**0.09 J**	**0.29 J**	**0.18 J**	**0.3 J**
Silver	2.1	560	39	1.6	NA	1.5 U	**0.13 J**	1.2 U	1.3 U	**0.06 J**	**0.07 J**
Sodium	521	--	--	--	NA	**20.9 K**	**83.8 K**	**17.1 K**	**49 K**	**37.1 K**	**39.6 K**
Vanadium	27.9	130	39	180	NA	**8.1**	**22**	**9.1**	**23.8**	**20.6**	**24**
Zinc	26.5	120	2,300	680	NA	**8 K**	**91.7 K**	**13.9 K**	**119 K**	**61.1 K**	**55.1 K**
Wet Chemistry											
pH (ph)	--	--	--	--	NA	**7**	**8.6**	**6.1**	**8.3**	**7.3**	**7.2**
Total organic carbon (TOC) (ug/g)	--	--	--	--	NA	**2,100**	**2,600**	**3,900**	**5,200**	**5,500**	**5,300**
Grain Size (PCT/P)											
GS07 Sieve 1" (25.0 mm)	--	--	--	--	NA	**100**	**100**	**100**	**100**	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	NA	**100**	**100**	**100**	**96**	**100**	**95**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	NA	**100**	**80**	**98**	**88**	**96**	**89**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	NA	**100**	**64**	**98**	**87**	**96**	**88**
Sieve No. 004 (4.75 mm)	--	--	--	--	NA	**100**	**54**	**98**	**83**	**93**	**86**
Sieve No. 010 (2.00 mm)	--	--	--	--	NA	**100**	**43**	**97**	**80**	**90**	**84**
Sieve No. 020 (850 um)	--	--	--	--	NA	**99**	**36**	**95**	**77**	**88**	**82**
Sieve No. 040 (425 um)	--	--	--	--	NA	**95**	**31**	**89**	**71**	**82**	**77**
Sieve No. 060 (250 um)	--	--	--	--	NA	**71**	**25**	**53**	**53**	**61**	**57**
Sieve No. 100 (150 um)	--	--	--	--	NA	**45**	**18**	**16**	**36**	**40**	**37**
Sieve No. 200 (75 um)	--	--	--	--	NA	**33**	**13**	**0.3**	**26**	**29**	**28**

Notes:

Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeecds BKG, ECO, RSL & SSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PG/G - Picograms per gram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 4-2
Site 9 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS09-SB01	CAS09-SB02	CAS09-SB03	CAS09-SB04	CAS09-SB05	
Sample ID					CAS09-SB01-1009	CAS09-SB02-1109	CAS09-SB03-1109	CAS09-SB04-1109	CAS09-SB05-1109	CAS09-SB05P-1109
Sample Date					10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Depth					0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'
Chemical Name										
Volatile Organic Compounds (UG/KG)										
Acetone	--	--	6,100,000	4,500	**93 J**	44 B	40 B	68 B	**86**	**80**
Methylene chloride	--	1,250	11,000	1.2	25 UJ	24 U	22 U	25 UJ	**43**	**54**
Toluene	--	40,000	500,000	1,600	**2 J**	5 U	**2 J**	**2 J**	5 U	5 U
Semivolatile Organic Compounds (UG/KG)										
Benzo(a)anthracene	--	HMW PAH	150	10	23 U	22 U	19 U	11 B	**4.8 J**	22 U
Benzo(a)pyrene	--	HMW PAH	15	3.5	23 U	22 U	19 U	22 U	**4.7 J**	22 U
Benzo(b)fluoranthene	--	HMW PAH	150	35	23 U	**2.6 J**	19 U	**11 J**	**7.7 J**	22 U
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	23 U	22 U	19 U	**8.8 L**	22 U	22 U
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100	120 U	110 U	93 U	110 U	**59 J**	110 U
Chrysene	--	HMW PAH	15,000	1,100	23 U	**1.9 J**	19 U	22 U	**6.4 J**	22 U
Dibenz(a,h)anthracene	--	HMW PAH	15	11	23 U	22 U	19 U	**12 J**	22 U	22 U
Fluoranthene	--	LMW PAH	230,000	160,000	23 U	**3.3 J**	19 U	4.9 B	**10 J**	22 U
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	23 U	22 U	19 U	**7.6 J**	**4.8 J**	22 U
PAH (HMW)	--	18,000	--	--	104 U	**73.3**	85.5 U	**88.9**	**70.6**	99 U
PAH (LMW)	--	29,000	--	--	104 U	**91.3**	85.5 U	**62.3**	**92**	99 U
Phenanthrene	--	LMW PAH	1,700,000	360,000	23 U	22 U	19 U	**2.8 J**	**5 J**	22 U
Pyrene	--	HMW PAH	170,000	120,000	23 U	**2.8 J**	19 U	22 U	**9.2 J**	22 U
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	--	583	2,000	66	3.8 UJ	**3.1 J**	3.2 U	3.5 U	3.2 U	3.4 U
4,4'-DDT	--	100	1,700	67	3.8 UJ	3.4 U	0.92 B	1.1 B	**8.4**	3.4 U
Aroclor-1260	--	8,000	220	24	21 U	**41**	17 U	19 U	**100**	19 U
Dieldrin	--	10.5	30	0.17	3.8 UJ	3.4 U	3.2 U	3.5 U	**1.4 J**	3.4 U
Endosulfan II	--	6.32	37,000	3,000	3.8 UJ	**0.76 J**	3.2 U	3.5 U	**1.1 J**	3.4 U
Endosulfan sulfate	--	6.32	37,000	3,000	3.8 UJ	3.4 U	3.2 U	**0.76 J**	**6.4 J**	3.4 U
gamma-Chlordane	--	11.0	1,600	13	2 UJ	1.8 U	1.6 U	1.8 U	**0.84 J**	1.8 U
Total Metals (MG/KG)										
Aluminum	13,000	pH < 5.5	7,700	55,000	**27,300**	**18,900**	**7,180**	**10,400**	**17,000**	**17,600**
Antimony	--	78.0	3.1	0.66	**0.22 L**	**0.16 L**	**0.07 L**	**0.1 L**	**0.13 L**	**0.15 L**
Arsenic	5.54	18.0	0.39	0.0013	**7.1**	**4**	**1.6**	**2.6**	**4.1**	**4.3**
Barium	84.5	330	1,500	300	**35.3**	**48.2**	**28.4**	**37.8**	**44.4**	**38.7**
Beryllium	0.52	40.0	16	58	**0.59**	**0.59**	**0.39 J**	**0.48**	**0.43 J**	**0.42 J**
Calcium	2,380	--	--	--	**1,960**	**1,970**	**667**	**1,130**	**1,630**	**1,670**
Chromium	33.7	64.0	0.29	8.30E-04	**40.7 K**	**26.9 K**	**10.6 K**	**15.6 K**	**23.4 K**	**24.6 K**
Cobalt	5.18	13.0	2.3	0.49	**4.7**	**3.6**	**1.9**	**2.4**	**3.1**	**3.2**
Copper	3.17	70.0	310	51	**5.9 K**	**106 K**	**3.8 K**	**8.9 K**	**4.8 K**	**3.9 K**
Cyanide	2.7	15.8	160	7.4	**0.36 J**	0.84 U	0.77 U	0.77 U	0.84 U	0.77 U
Iron	32,000	5 < pH > 8	5,500	640	**28,700**	**20,700**	**8,400**	**13,000**	**19,400**	**19,700**
Lead	8.79	120	400	--	**9.6 K**	**10.2 K**	**7.6 K**	**6.9 K**	**7.1 K**	**7 K**
Magnesium	1,120	--	--	--	**1,740 K**	**1,720 K**	**468 K**	**811 K**	**1,020 K**	**1,020 K**
Manganese	176	220	180	57	**34.3 K**	**106 K**	**83.4 K**	**78.1 K**	**36.4 K**	**34.1 K**
Mercury	0.14	0.10	2.3	0.57	**0.04**	**0.01 J**	0.036 U	0.032 U	**0.02 J**	**0.05**
Nickel	17.6	38.0	150	48	**10.3 J**	**13.2 J**	**3.3 J**	**5 J**	**5.8 J**	**6.4 J**
Potassium	901	--	--	--	**879 K**	**801 K**	**297 K**	**575 K**	**483 K**	**471 K**
Selenium	0.64	0.52	39	0.95	**0.34 J**	**0.37 J**	**0.26 J**	**0.19 J**	**0.33 J**	**0.37 J**
Sodium	811	--	--	--	**42.6 K**	**51.4 K**	**20.8 K**	**33 K**	**37.9 K**	**36.7 K**
Vanadium	48.3	130	39	180	**52.2**	**34.1**	**14.1**	**20.5**	**32.5**	**34.1**
Zinc	28	120	2,300	680	**21.7 K**	**34 K**	**9.1 K**	**16.5 K**	**15.4 K**	**14.7 K**
Wet Chemistry										
pH (ph)	--	--	--	--	**6.2**	**7.3**	**7**	**7.2**	**8**	**7.3**
Total organic carbon (TOC) (ug/g)	--	--	--	--	**1,800**	**1,500**	**2,700**	**2,000**	**1,500**	**2,000**

TABLE 4-2
Site 9 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS09-SB01	CAS09-SB02	CAS09-SB03	CAS09-SB04	CAS09-SB05	
Sample ID					CAS09-SB01-1009	CAS09-SB02-1109	CAS09-SB03-1109	CAS09-SB04-1109	CAS09-SB05-1109	CAS09-SB05P-1109
Sample Date					10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Depth					0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'
Chemical Name										
Grain Size (PCT/P)										
GS07 Sieve 1" (25.0 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**	**100**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**	**100**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**	**100**
Sieve No. 004 (4.75 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**	**100**
Sieve No. 010 (2.00 mm)	--	--	--	--	**100**	**99**	**100**	**99**	**100**	**100**
Sieve No. 020 (850 um)	--	--	--	--	**99**	**98**	**98**	**97**	**99**	**99**
Sieve No. 040 (425 um)	--	--	--	--	**94**	**93**	**93**	**93**	**95**	**85**
Sieve No. 060 (250 um)	--	--	--	--	**72**	**72**	**67**	**71**	**74**	**74**
Sieve No. 100 (150 um)	--	--	--	--	**50**	**52**	**45**	**49**	**55**	**54**
Sieve No. 200 (75 um)	--	--	--	--	**41**	**41**	**37**	**40**	**44**	**44**

Notes:

Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeds BKG, ECO, RSL & SSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 4-3
Site 9 Groundwater Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG GW YE AQUIFER	CLEAN MCL-Groundwater	CLEAN RSLs Tapwater Adjusted	CAS09-GW01	CAS09-GW02	CAS09-GW03		CAS09-GW04
Sample ID				CAS09-GW01-1109	CAS09-GW02-1109	CAS09-GW03-1109	CAS09-GW03P-1109	CAS09-GW04-1109
Sample Date				11/02/09	11/04/09	11/04/09	11/04/09	11/03/09
Chemical Name								
Volatile Organic Compounds (UG/L)								
No Detections				NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/L)								
Benzo(a)anthracene	--	--	0.029	0.19 U	0.2 U	**0.14 J**	**0.16 J**	0.21 U
Benzo(a)pyrene	--	0.2	0.0029	0.19 U	0.2 U	**0.11 J**	0.2 U	0.21 U
Pesticide/Polychlorinated Biphenyls (UG/L)								
4,4'-DDD	--	--	0.28	0.094 U	0.1 U	0.11 U	0.11 U	**0.12 J**
4,4'-DDE	--	--	0.2	0.094 U	0.1 U	0.11 U	0.11 U	**0.038 J**
alpha-Chlordane	--	--	0.19	0.047 U	0.053 U	0.057 U	0.054 U	**0.036 J**
Endosulfan I	--	--	22	0.047 U	0.053 U	0.057 U	0.054 U	**0.036 J**
Endosulfan II	--	--	22	0.094 U	0.1 U	0.11 U	0.11 U	**0.025 J**
Endrin ketone	--	2	1.1	0.094 U	0.1 U	0.11 U	0.11 U	**0.071 J**
gamma-Chlordane	--	--	0.19	0.047 U	0.053 U	0.057 U	0.054 U	**0.048**
Total Metals (UG/L)								
Aluminum	2,230	--	3,700	**2,820**	**233 J**	**279 J**	**350**	**133 J**
Antimony	18.8	6	1.5	**0.57 J**	**0.82 J**	**1.1**	**0.95 J**	**0.29 J**
Arsenic	2.28	10	0.045	5 U	**2 J**	5 U	**1.9 J**	5 U
Barium	118	2,000	730	**57.6**	**41.3**	**32.9**	**30.4**	**33.9**
Beryllium	2.45	4	7.3	**0.16 J**	1 U	1 U	1 U	1 U
Cadmium	0.605	5	1.8	**0.08 J**	**0.23 J**	**0.12 J**	**0.14 J**	**0.08 J**
Calcium	169,000	--	--	**145,000**	**140,000**	**142,000**	**136,000**	**143,000**
Chromium	15.1	100	0.043	**5.1 J**	**0.95 J**	**1.2 J**	**1.6 J**	15 U
Cobalt	20.6	--	1.1	**0.73 J**	30 U	**0.35 J**	30 U	30 U
Copper	12.2	1,300	150	**25**	**2.3 J**	**2.6 J**	**3.7 J**	**1.6 J**
Iron	894	--	2,600	**5,050**	**836**	**608**	**687**	**2,480**
Lead	21.3	15	15	**4.3 J**	**1.2 J**	**2.5 J**	**2.3 J**	**2.1 J**
Magnesium	11,500	--	--	**2,330**	**2,670**	**1,920**	**1,760**	**1,790**
Manganese	57.9	--	88	**113**	**95**	**51.7**	**35.8**	**76.3**
Nickel	11.4	--	73	**2.8 J**	**3.4 J**	**2.5 J**	**2.5 J**	**0.32 J**
Potassium	12,700	--	--	**1,610**	**2,230**	**1,090**	**1,040**	**1,040**
Selenium	--	50	18	**3.2 J**	**3.3 J**	10 U	10 U	10 U
Sodium	64,500	--	--	**6,820**	**7,970**	**5,270**	**4,700**	**8,720**
Vanadium	26.2	--	18	**5.7 J**	25 U	25 U	25 U	25 U
Zinc	4.52	--	1,100	**15.8 J**	**4.6 J**	**2.3 J**	**3.4 J**	**2 J**
Dissolved Metals (UG/L)								
Aluminum, Dissolved	100	--	3,700	**168 J**	60.3 B	53.4 B	54.2 B	55.9 B
Antimony, Dissolved	9.7	6	1.5	**0.54 J**	**0.82 J**	**1**	**0.61 J**	**0.21 J**
Barium, Dissolved	127	2,000	730	**43.9**	**43**	**32.9**	**29.4**	**33.3**
Cadmium, Dissolved	0.177	5	1.8	1 U	**0.17 J**	**0.11 J**	**0.11 J**	1 U
Calcium, Dissolved	11,300	--	--	**140,000**	**145,000**	**140,000**	**131,000**	**143,000**
Chromium, Dissolved	6.04	100	0.043	**0.86 J**	15 U	**0.54 J**	15 U	15 U
Cobalt, Dissolved	0.7	--	1.1	30 U	**0.43 J**	**0.47 J**	30 U	30 U
Copper, Dissolved	3	1,300	150	25 U	25 U	**0.77 J**	**2.2 J**	25 U
Iron, Dissolved	275	--	2,600	**2,220**	**635**	**204**	**109**	**2,220**
Magnesium, Dissolved	11,200	--	--	**2,090**	**2,620**	**1,900**	**1,620**	**1,760**
Manganese, Dissolved	49.5	--	88	**84.3**	**93.9**	**54.2**	**30.1**	**76**

TABLE 4-3
Site 9 Groundwater Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG GW YE AQUIFER	CLEAN MCL-Groundwater	CLEAN RSLs Tapwater Adjusted	CAS09-GW01	CAS09-GW02	CAS09-GW03		CAS09-GW04
Sample ID				CAS09-GW01-1109	CAS09-GW02-1109	CAS09-GW03-1109	CAS09-GW03P-1109	CAS09-GW04-1109
Sample Date				11/02/09	11/04/09	11/04/09	11/04/09	11/03/09
Chemical Name								
Nickel, Dissolved	12.2	--	73	**0.7 J**	**3 J**	**2.6 J**	**1.4 J**	**0.54 J**
Potassium, Dissolved	12,600	--	--	**1,410**	**2,120**	**1,080**	**884 J**	**1,020**
Selenium, Dissolved	9.1	50	18	10 U	10 U	10 U	**4.2 J**	10 U
Dissolved Metals (UG/L)								
Sodium, Dissolved	10,000	--	--	**6,930**	**8,170**	**5,510**	**4,730**	**8,680**
Zinc, Dissolved	--	--	1,100	25 U	**2.6 J**	25 U	25 U	25 U

Notes:

Exceeds Background
Exceeds BKG & MCL
Exceeds BKG & RSL
Exceeds BKG, MCL & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
UG/L - Micrograms per liter

TABLE 4-4
Site 9 Surface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CAS09-SD01	CAS09-SD02	CAS09-SD03
Sample ID			CAS09-SD01-1209A	CAS09-SD02-1209A	CAS09-SD03-1209A
Sample Date			12/09/09	12/09/09	12/09/09
Depth			0-4"	0-4"	0-4"
Chemical Name					
Volatile Organic Compounds (UG/KG)					
Tetrachloroethene	179	550	**2 J**	**5 J**	**15 J**
Semivolatile Organic Compounds (UG/KG)					
Acenaphthene	LPAH	340,000	**20 J**	23 U	26 U
Acenaphthylene	LPAH	340,000	**9.5 J**	23 U	**1.8 J**
Anthracene	LPAH	1,700,000	**40**	23 U	26 U
Benzo(a)anthracene	HPAH	150	**260**	17 B	27 B
Benzo(a)pyrene	HPAH	15	**210**	**11 J**	**19 J**
Benzo(b)fluoranthene	HPAH	150	**370**	26 B	**49**
Benzo(g,h,i)perylene	HPAH	170,000	**38**	23 UL	**4.1 J**
Benzo(k)fluoranthene	HPAH	1,500	**110**	**5.2 J**	**14 J**
bis(2-Ethylhexyl)phthalate	30,000	35,000	**63 J**	120 U	130 U
Carbazole	--	--	**52**	6.3 B	6.8 B
Chrysene	HPAH	15,000	**290**	**6.4 J**	**20 J**
Dibenz(a,h)anthracene	HPAH	15	**78 J**	23 U	**14 J**
Fluoranthene	LPAH	230,000	**560**	**26 K**	**46**
Fluorene	LPAH	230,000	**27 J**	23 U	26 U
Indeno(1,2,3-cd)pyrene	HPAH	150	**190**	**12 J**	**20 J**
Naphthalene	LPAH	3,600	**14 J**	23 U	26 U
PAH (HMW)	18,000	--	**1,916**	**99.1**	**185**
PAH (LMW)	29,000	--	**1,019**	**121**	**144**
Phenanthrene	LPAH	1,700,000	**320**	**14 J**	**18 J**
Pyrene	HPAH	170,000	**370**	**20 J**	**31**
Pesticide/Polychlorinated Biphenyls (UG/KG)					
4,4'-DDD	583	2,000	**370 J**	**40 J**	4.5 U
4,4'-DDE	114	1,400	**52 J**	2.7 B	**24 J**
4,4'-DDT	100	1,700	**800**	**44 J**	**550**
alpha-Chlordane	11.0	1,600	**2.3 J**	2 UJ	**1.5 J**
Aroclor-1260	8,000	220	**9,700 J**	**540 K**	**7,300 J**
Dieldrin	10.5	30	**140 J**	**6.8 J**	4.5 U
Endosulfan II	6.32	37,000	**90 J**	**5.5 J**	**80 J**
Endosulfan sulfate	6.32	37,000	**540 J**	**29 J**	4.5 U
Endrin ketone	1.95	1,800	**620 J**	3.8 UJ	4.5 U
gamma-Chlordane	11.0	1,600	**78 J**	**3.2 J**	**52 J**
Total Metals (MG/KG)					
Aluminum	pH < 5.5	7,700	**10,100**	**21,500**	**26,000**
Arsenic	18.0	0.39	**3.1 L**	**6.2 L**	**6.5 L**
Barium	330	1,500	**44.8**	**60.7**	**59.1**
Beryllium	40.0	16	**0.61**	**0.57**	**0.83**
Cadmium	32.0	7	**0.74**	**0.24**	**0.38**
Calcium	--	--	**1,580**	**1,910**	**2,160**
Chromium	64.0	0.29	**16.8 L**	**31.7 L**	**37.5 L**
Cobalt	13.0	2.3	**3**	**3.6 J**	**4**
Copper	70.0	310	**55.1 J**	**9.9 J**	**16.3 J**
Iron	5 < pH > 8	5,500	**10,500**	**21,700**	**25,200**

TABLE 4-4
Site 9 Surface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CAS09-SD01	CAS09-SD02	CAS09-SD03
Sample ID			CAS09-SD01-1209A	CAS09-SD02-1209A	CAS09-SD03-1209A
Sample Date			12/09/09	12/09/09	12/09/09
Depth			0-4"	0-4"	0-4"
Chemical Name					
Lead	120	400	**64.8**	**40.3**	**33.9**
Magnesium	--	--	**1,510**	**1,570**	**1,830**
Manganese	220	180	**135**	**35.8**	**42.1**
Mercury	0.10	2.3	**0.26**	**0.07**	**0.18**
Nickel	38.0	150	**9**	**9.1**	**10.4**
Potassium	--	--	**686 K**	**718 K**	**1,060 K**
Selenium	0.52	39	0.9 U	1.5 U	**0.65 J**
Total Metals (MG/KG)					
Vanadium	130	39	**24.6**	**44.3**	**48.2**
Zinc	120	2,300	**104**	**46.2**	**53.8**
Wet Chemistry					
pH (ph)	--	--	**6.1**	**6.1**	**6.3**
Total organic carbon (TOC) (ug/g)	--	--	**25,000**	**8,100**	**13,000**

Notes:
Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 4-5
Site 9 Subsurface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CAS09-SD01	CAS09-SD02	CAS09-SD03
Sample ID			CAS09-SD01-1209B	CAS09-SD02-1209B	CAS09-SD03-1209B
Sample Date			12/09/09	12/09/09	12/09/09
Depth			4-8"	4-8"	4-8"
Chemical Name					
Volatile Organic Compounds (UG/KG)					
Tetrachloroethene	179	550	6 U	**4 J**	6 U
Semivolatile Organic Compounds (UG/KG)					
Acenaphthylene	LPAH	340,000	22 U	**1.8 J**	26 U
Benzo(a)pyrene	HPAH	15	**11 J**	**9.1 J**	26 U
Benzo(k)fluoranthene	HPAH	1,500	**6.5 J**	**5.7 J**	26 U
Chrysene	HPAH	15,000	**7.1 J**	**3.8 J**	26 U
Fluoranthene	LPAH	230,000	**28**	**19 J**	**4.1 J**
Indeno(1,2,3-cd)pyrene	HPAH	150	**11 J**	**11 J**	26 U
PAH (HMW)	18,000	--	**96.1**	**87.1**	**98.5**
PAH (LMW)	29,000	--	**117**	**104**	**108**
Phenanthrene	LPAH	1,700,000	**12 J**	**11 J**	26 U
Pyrene	HPAH	170,000	**18 J**	**14 J**	**3.3 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)					
4,4'-DDD	583	2,000	**46 J**	4 UJ	4.1 U
4,4'-DDE	114	1,400	**5.1 J**	**5.3 J**	2.9 B
4,4'-DDT	100	1,700	**49 J**	**110 J**	**68**
alpha-Chlordane	11.0	1,600	**0.48 J**	**0.62 J**	2.1 U
Aroclor-1260	8,000	220	**620**	**1,700 J**	**940 J**
Dieldrin	10.5	30	**7.7 J**	4 UJ	4.1 U
Endosulfan II	6.32	37,000	**5.7 J**	**17 J**	**10 J**
Endosulfan sulfate	6.32	37,000	**34 J**	4 UJ	4.1 U
gamma-Chlordane	11.0	1,600	**4.6 J**	**11 J**	**5.9 J**
Total Metals (MG/KG)					
Aluminum	pH < 5.5	7,700	**8,340**	**33,500**	**32,900**
Arsenic	18.0	0.39	**2.1 L**	**8.8 L**	**10.3 L**
Barium	330	1,500	**34.4**	**75.4**	**76.6**
Beryllium	40.0	16	**0.4 J**	**0.99**	**0.98**
Cadmium	32.0	7	**0.25**	**0.04 J**	**0.11 J**
Calcium	--	--	**720**	**2,900**	**2,850**
Chromium	64.0	0.29	**11.5 L**	**45.8 L**	**46.3 L**
Cobalt	13.0	2.3	**1.9 J**	**5 J**	**5.1 J**
Copper	70.0	310	**7.1 J**	**4.7 J**	**5.5 J**
Iron	5 < pH > 8	5,500	**8,270**	**30,600**	**31,800**
Lead	120	400	**15**	**11.7**	**13**
Magnesium	--	--	**617**	**2,320**	**2,260**
Manganese	220	180	**88.4**	**30.7**	**30.8**
Mercury	0.10	2.3	**0.15**	**0.04**	**0.06**
Nickel	38.0	150	**4.2**	**13.4**	**13.4**
Potassium	--	--	**478 K**	**1,300 K**	**1,210 K**

TABLE 4-5

Site 9 Subsurface Sediment Data Exceedance Results

Sites 4, 9, and AOC 3 Site Inspection

Cheatham Annex

Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CAS09-SD01	CAS09-SD02	CAS09-SD03
Sample ID			CAS09-SD01-1209B	CAS09-SD02-1209B	CAS09-SD03-1209B
Sample Date			12/09/09	12/09/09	12/09/09
Depth			4-8"	4-8"	4-8"
Chemical Name					
Selenium	0.52	39	**0.21 J**	**0.53 J**	2.4 U
Total Metals (MG/KG)					
Thallium	1.00	--	1.3 U	**0.35 J**	3.5 U
Vanadium	130	39	**15**	**61.2**	**60.1**
Zinc	120	2,300	**31.5**	**25.3**	**27**
Wet Chemistry					
pH (ph)	--	--	**6.2**	**6**	**6**
Total organic carbon (TOC) (ug/g)	--	--	**3,100**	**3,700**	**4,200**

Notes:

Exceeds ECO

Exceeds RSL

Exceeds ECO & RSL

Bold indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in blanks

J - Analyte present, value may or may not be accurate or precise

K - Analyte present, value may be biased high, actual value may be lower

L - Analyte present, value may be biased low, actual value may be higher

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UL - Analyte not detected, quantitation limit is probably higher

MG/KG - Milligrams per kilogram

PH - pH units

UG/G - Micrograms per gram

UG/KG - Micrograms per kilogram

TABLE 4-6
Site 9 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Site Potentially CERCLA-eligible?	Step 1 Inorganics Above Background or Non-inorganics Detected?	Step 1 Potentially Attributable to CERCLA Release?	Step 2a Exceedances of Comparison Criteria?	Step 2b Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3 Is further Investigation or Action Required?
Site 9 Surface Soil	Yes	VOCs	Yes	Methylene chloride (>bkg & SSL)	(HH risk value not evaluated quantitatively)	Yes
		SVOCs	Yes	Benzo(a)anthracene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Benzo(a)pyrene (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				Benzo(b)fluoranthene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		PCBs	Yes	Aroclor-1260 (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
		Pesticides	No	Dieldrin (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				Endosulfan II (>bkg & Eco)	acceptable Eco risk value	
				Endosulfan sulfate (>bkg & Eco)	exceeds acceptable Eco risk value	
				gamma-BHC (Lindane) (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		Dioxin/Furans	No	N/A	N/A	
		Total Metals	Yes	Aluminum (>bkg & Res RSL)	acceptable HH risk value	
				Chromium (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				Copper (>bkg, Eco, SSL, & Res RSL)	acceptable HH risk value; exceeds acceptable Eco risk value	
				Nickel (>bkg & Eco)	acceptable Eco risk value	
Site 9 Subsurface Soil	Yes	VOCs	Yes	Methylene chloride (>bkg & SSL)	(HH risk value not evaluated quantitatively)	No
		SVOCs	Yes	Benzo(a)pyrene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Dibenz(a,h)anthracene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		PCBs	Yes	Aroclor-1260 (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		Pesticides	Yes	Dieldrin (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Endosulfan sulfate (>bkg & Eco)	acceptable Eco risk value	
		Dioxin/Furans	No	N/A	N/A	
		Total Metals	Yes	Aluminum (>bkg & Res RSL)	acceptable HH risk value	
				Arsenic (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				Chromium (>bkg, SSL, & Res RSL)	exceeds acceptable HH risk value	
				Copper (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				Vanadium (>bkg & Res RSL)	acceptable HH risk value	

Notes:
N/A - Not applicable

TABLE 4-6
Site 9 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1 Site Potentially CERCLA-eligible?	Step 1 Inorganics Above Background or Non-inorganics Detected?	Step 1 Potentially Attributable to CERCLA Release?	Step 2a Exceedances of Comparison Criteria?	Step 2b Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3 Is further Investigation or Action Required?
Site 9 Groundwater	Yes	VOCs	No	N/A	N/A	No
		SVOCs	Yes	Benzo(a)anthracene (>bkg & Tapwater RSL)	acceptable HH risk value	
				Benzo(a)pyrene (>bkg & Tapwater RSL)	acceptable HH risk value	
		PCBs	No	N/A	N/A	
		Pesticides	Yes	No	N/A	
		Total Metals	Yes	Iron (>bkg & Tapwater RSL)	acceptable HH risk value	
				Manganese (>bkg & Tapwater RSL)	acceptable HH risk value	
		Dissolved Metals	Yes	Manganese, Dissolved (>bkg & Tapwater RSL)	acceptable HH risk value	
Site 9 Surface Sediment	Yes	VOCs	Yes	No	N/A	Yes
		SVOCs	Yes	Benzo(a)anthracene (>Res RSL)	exceeds acceptable HH risk value	
				Benzo(a)pyrene (>Res RSL)	exceeds acceptable HH risk value	
				Benzo(b)fluoranthene (>Res RSL)	exceeds acceptable HH risk value	
				Dibenz(a,h)anthracene (>Res RSL)	exceeds acceptable HH risk value	
				Indeno(1,2,3-cd)pyrene (>Res RSL)	exceeds acceptable HH risk value	
		PCBs	Yes	Aroclor-1260 (>Eco & Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
		Pesticides	Yes	4,4'-DDT (>Eco)	exceeds acceptable Eco risk value	
				Dieldrin (>Eco & Res RSL)	exceeds acceptable HH risk value	
				Endosulfan II (>Eco)	exceeds acceptable Eco risk value	
				Endosulfan sulfate (>Eco)	exceeds acceptable Eco risk value	
				Endrin ketone (>Eco)	exceeds acceptable Eco risk value	
				gamma-Chlordane (>Eco)	exceeds acceptable Eco risk value	
		Total Metals	Yes	Aluminum (>Res RSL)	acceptable HH risk value	
				Arsenic (>Res RSL)	exceeds acceptable HH risk value	
				Chromium (>Res RSL)	exceeds acceptable HH risk value	
				Cobalt (>Res RSL)	acceptable HH risk value	
				Iron (>Eco & Res RSL)	acceptable HH risk value; acceptable Eco risk value	
				Mercury (>Eco)	exceeds acceptable Eco risk value	
				Selenium (>Eco)	exceeds acceptable Eco risk value	
				Vanadium (>Res RSL)	acceptable HH risk value	

Notes:
N/A - Not applicable

TABLE 4-6
Site 9 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1 Site Potentially CERCLA-eligible?	Step 1 Inorganics Above Background or Non-inorganics Detected?	Step 1 Potentially Attributable to CERCLA Release?	Step 2a Exceedances of Comparison Criteria?	Step 2b Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3 Is further Investigation or Action Required?
Site 9 Subsurface Sediment	Yes	VOCs	Yes	No	N/A	Yes
		SVOCs	Yes	No	N/A	
		PCBs	Yes	Aroclor-1260 (>Res RSL)	exceeds acceptable HH risk value	
		Pesticides	Yes	4,4'-DDT (>Eco)	acceptable Eco risk value	
				Endosulfan II (>Eco)	exceeds acceptable Eco risk value	
				Endosulfan sulfate (>Eco)	exceeds acceptable Eco risk value	
				gamma-Chlordane (>Eco)	acceptable Eco risk value	
		Total Metals	Yes	Aluminum (>Res RSL)	acceptable HH risk value	
				Arsenic (>Res RSL)	exceeds acceptable HH risk value	
				Chromium (>Res RSL)	exceeds acceptable HH risk value	
				Cobalt (>Res RSL)	acceptable HH risk value	
				Iron (>Eco & Res RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				Mercury (>Eco)	acceptable Eco risk value	
				Vanadium (>Res RSL)	acceptable HH risk value	

Notes:
N/A - Not applicable

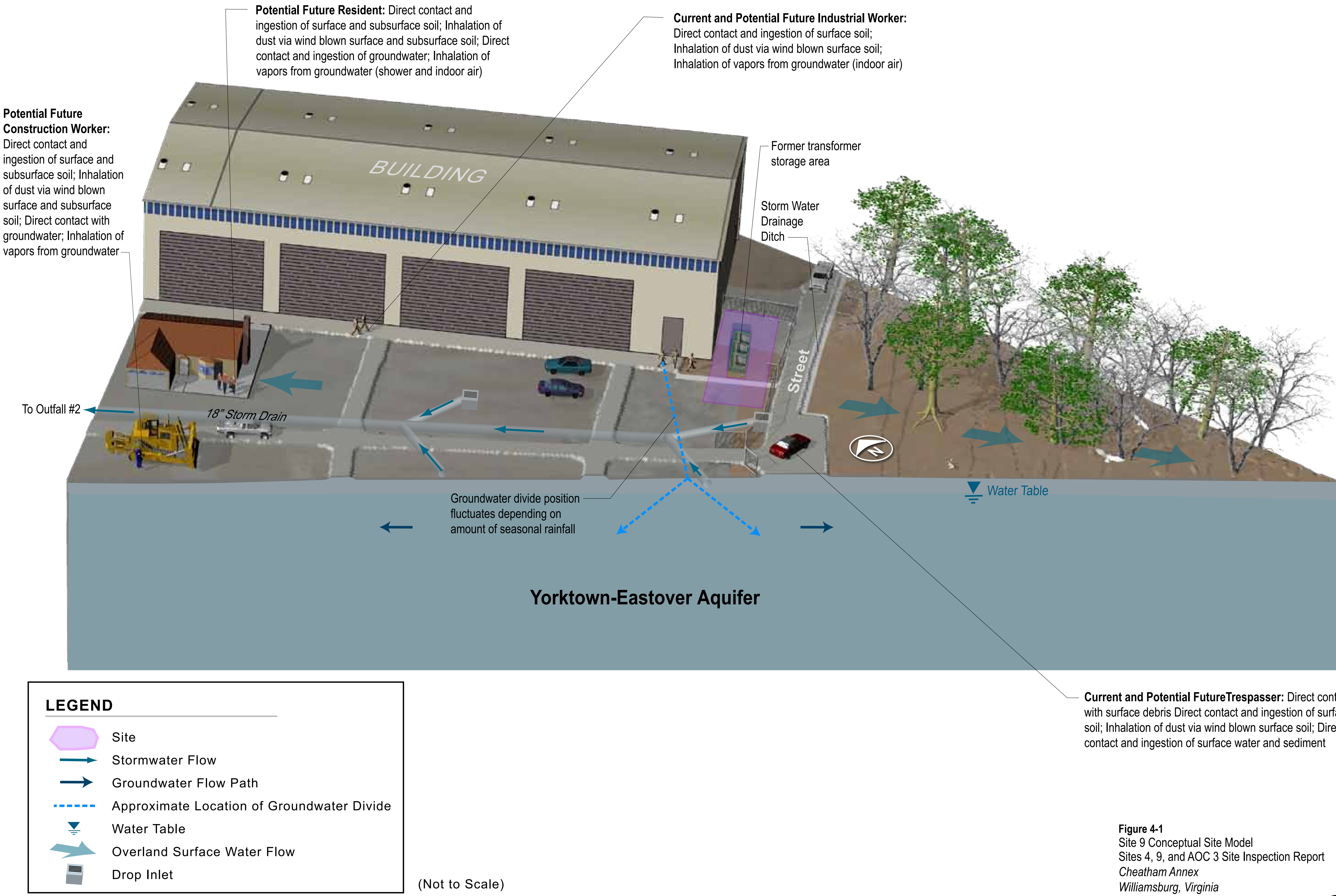
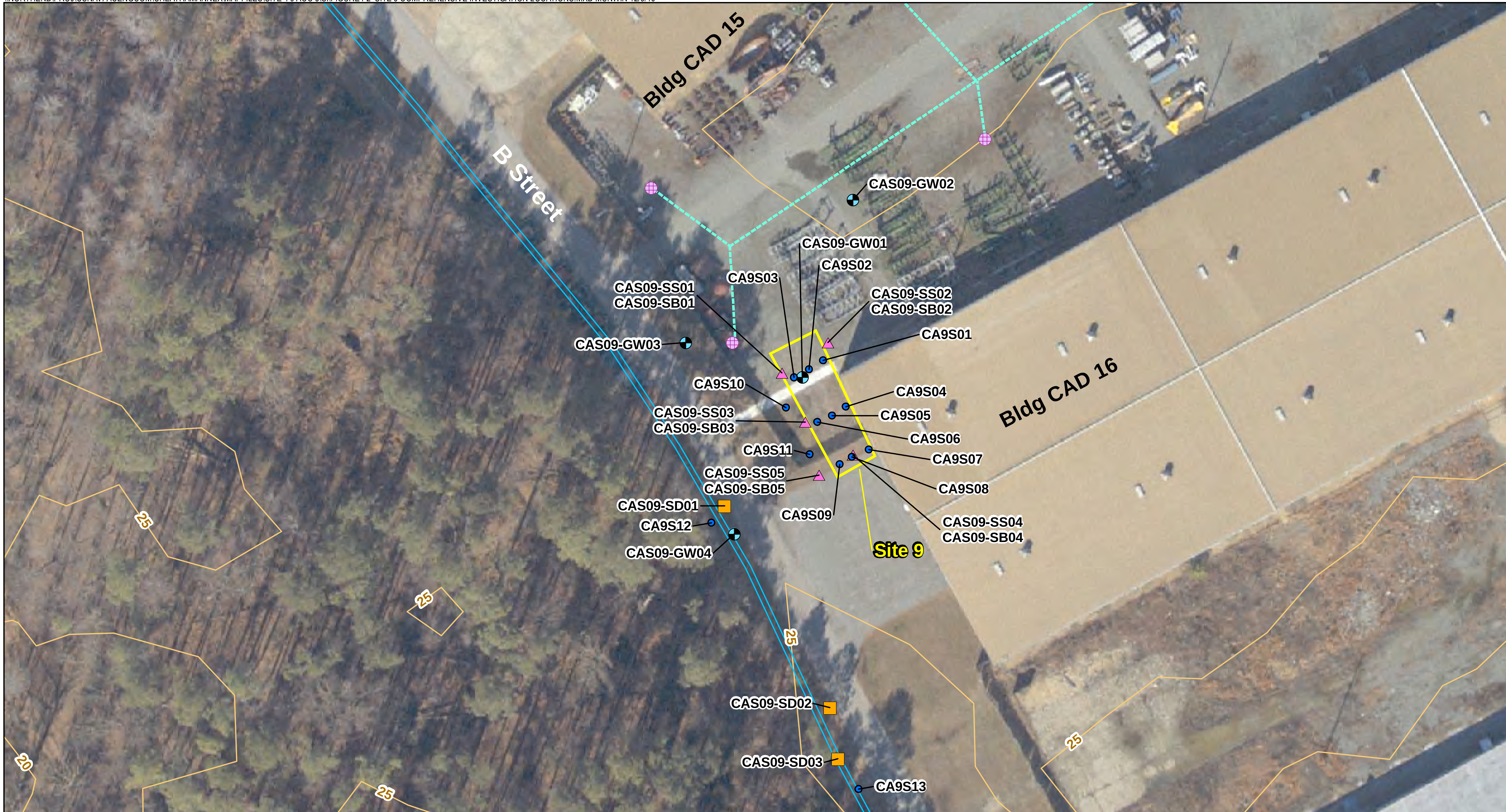


Figure 4-1
Site 9 Conceptual Site Model
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE4-2 SITE 9 COMPREHENSIVE INVESTIGATION LOCATIONS.MXD MUNWIN 12/9/10



Legend

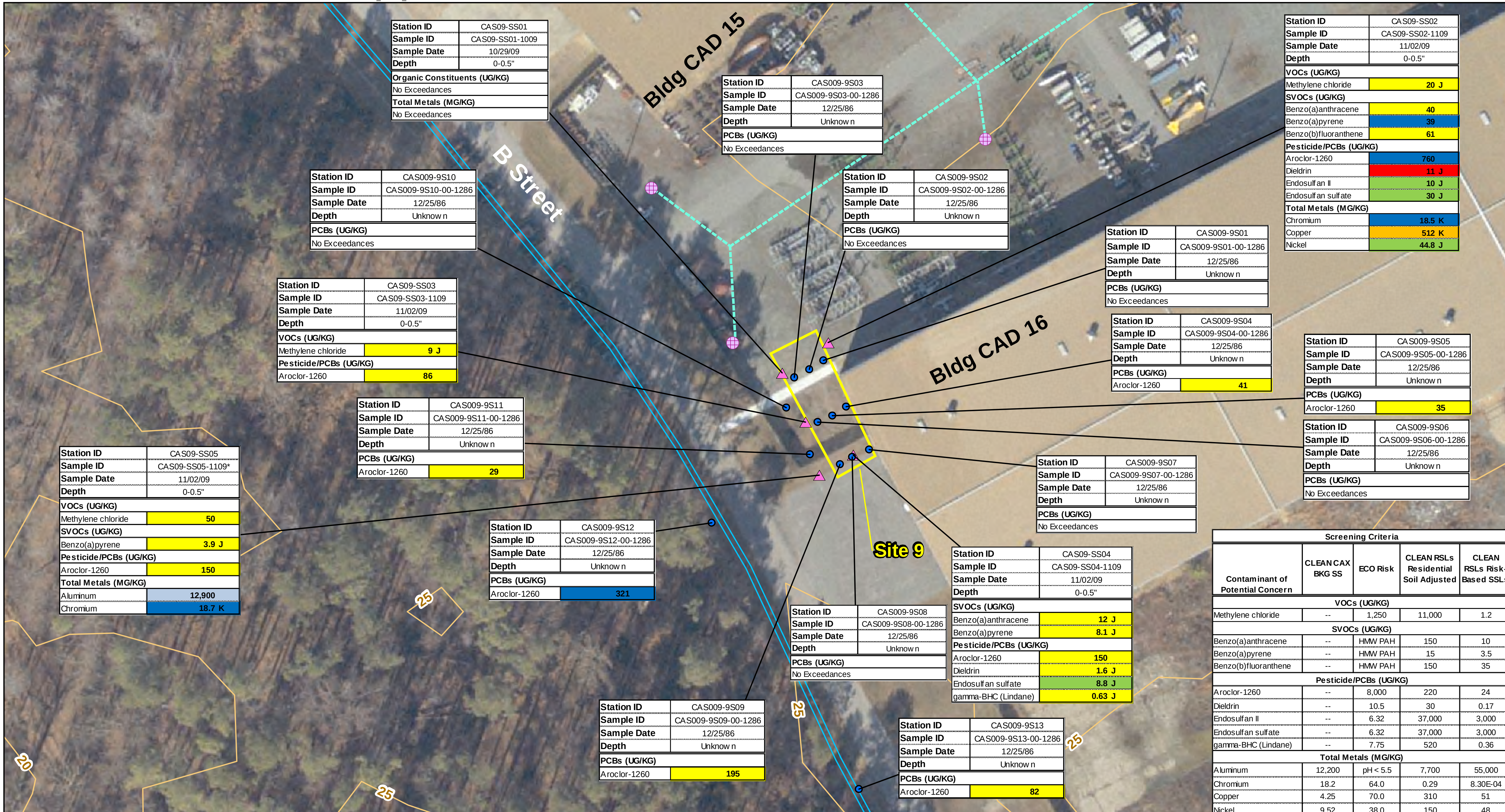
- 1986 Soil Samples
- Drop-In Box
- 2009 SI Sediment Sample Location
- 2009 SI Well Point Groundwater Sample Location
- 2009 SI Soil Sample Location
- Drainage Channel
- Storm Water Line
- Culvert
- Elevation Contour (5 ft interval)
- Study Area Boundary
- Storm Water Drainage Structure

N

0 60 120 Feet

Figure 4-2
Site 9 Comprehensive Investigation Locations
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL



Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
VOCs (UG/KG)				
Methylene chloride	--	1,250	11,000	1.2
SVOCs (UG/KG)				
Benzo(a)anthracene	--	HMW PAH	150	10
Benzo(a)pyrene	--	HMW PAH	15	3.5
Benzo(b)fluoranthene	--	HMW PAH	150	35
Pesticide/PCBs (UG/KG)				
Aroclor-1260	--	8,000	220	24
Dieldrin	--	10.5	30	0.17
Endosulfan II	--	6.32	37,000	3,000
Endosulfan sulfate	--	6.32	37,000	3,000
gamma-BHC (Lindane)	--	7.75	520	0.36
Total Metals (MG/KG)				
Aluminum	12,200	pH < 5.5	7,700	55,000
Chromium	18.2	64.0	0.29	8.30E-04
Copper	4.25	70.0	310	51
Nickel	9.52	38.0	150	48

Legend

- 1986 Soil Samples
- 2009 SI Soil Sample Location
- Drop-In Box
- Study Area Boundary
- Drainage Channel
- Storm Water Line
- Storm Water Drainage Structure
- Culvert
- Elevation Contour (5 ft interval)

- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceecds BKG, ECO, RSL & SSL

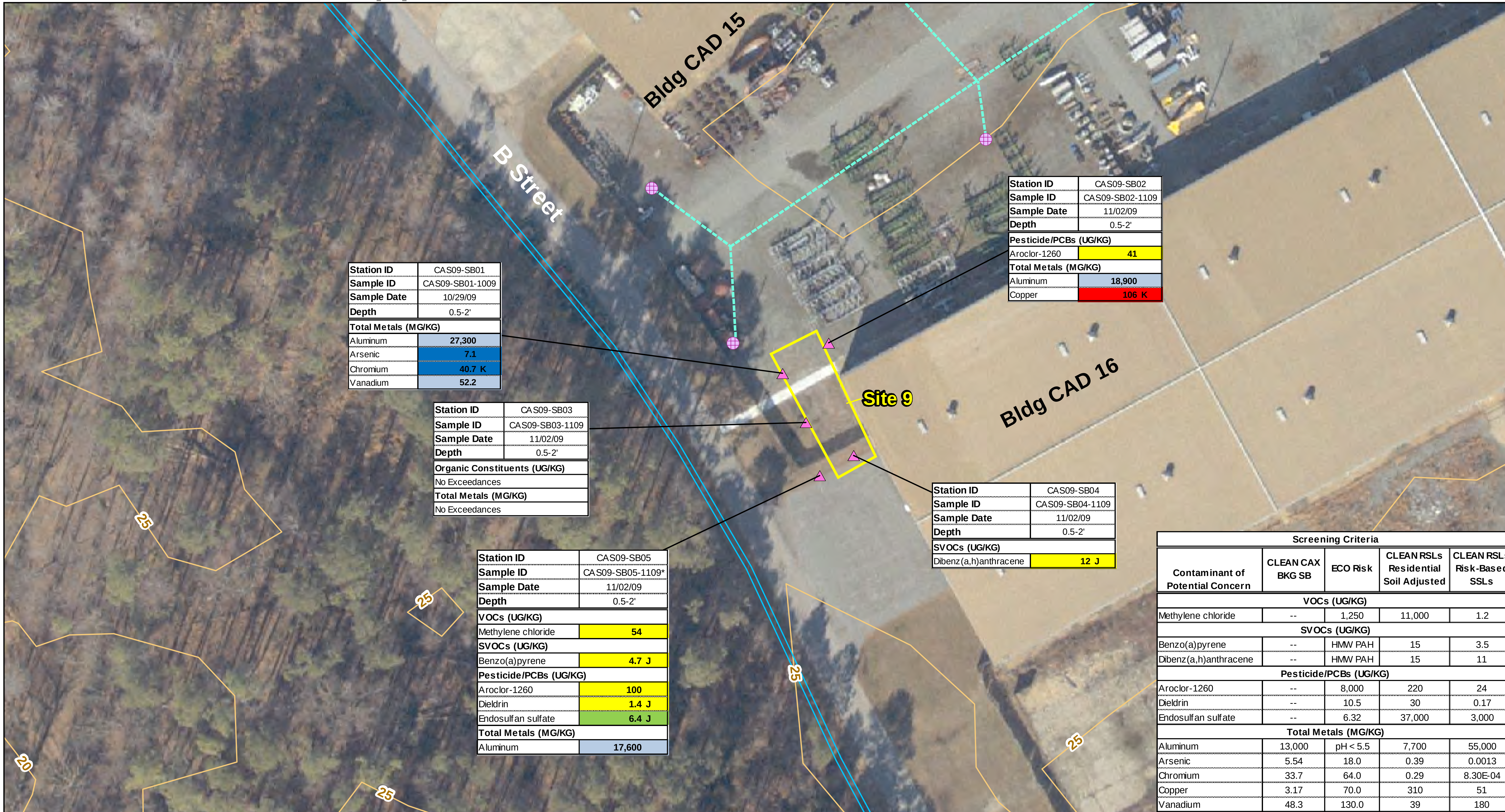
* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 60 120 Feet

Figure 4-3
Site 9 Surface Soil Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL



Station ID	CAS09-SB01
Sample ID	CAS09-SB01-1009
Sample Date	10/29/09
Depth	0.5-2'
Total Metals (MG/KG)	
Aluminum	27,300
Arsenic	7.1
Chromium	40.7 K
Vanadium	52.2

Station ID	CAS09-SB02
Sample ID	CAS09-SB02-1109
Sample Date	11/02/09
Depth	0.5-2'
Pesticide/PCBs (UG/KG)	
Aroclor-1260	41
Total Metals (MG/KG)	
Aluminum	18,900
Copper	106 K

Station ID	CAS09-SB03
Sample ID	CAS09-SB03-1109
Sample Date	11/02/09
Depth	0.5-2'
Organic Constituents (UG/KG)	
No Exceedances	
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAS09-SB04
Sample ID	CAS09-SB04-1109
Sample Date	11/02/09
Depth	0.5-2'
SVOCs (UG/KG)	
Dibenz(a,h)anthracene	12 J

Station ID	CAS09-SB05
Sample ID	CAS09-SB05-1109*
Sample Date	11/02/09
Depth	0.5-2'
VOCs (UG/KG)	
Methylene chloride	54
SVOCs (UG/KG)	
Benzo(a)pyrene	4.7 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	100
Dieldrin	1.4 J
Endosulfan sulfate	6.4 J
Total Metals (MG/KG)	
Aluminum	17,600

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
VOCs (UG/KG)				
Methylene chloride	--	1,250	11,000	1.2
SVOCs (UG/KG)				
Benzo(a)pyrene	--	HMW PAH	15	3.5
Dibenz(a,h)anthracene	--	HMW PAH	15	11
Pesticide/PCBs (UG/KG)				
Aroclor-1260	--	8,000	220	24
Dieldrin	--	10.5	30	0.17
Endosulfan sulfate	--	6.32	37,000	3,000
Total Metals (MG/KG)				
Aluminum	13,000	pH < 5.5	7,700	55,000
Arsenic	5.54	18.0	0.39	0.0013
Chromium	33.7	64.0	0.29	8.30E-04
Copper	3.17	70.0	310	51
Vanadium	48.3	130.0	39	180

Legend

- 2009 SI Soil Sample Location
- Drop-In Box
- Study Area Boundary
- Drainage Channel
- Storm Water Line
- Storm Water Drainage Structure
- Culvert
- Elevation Contour (5 ft interval)

- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

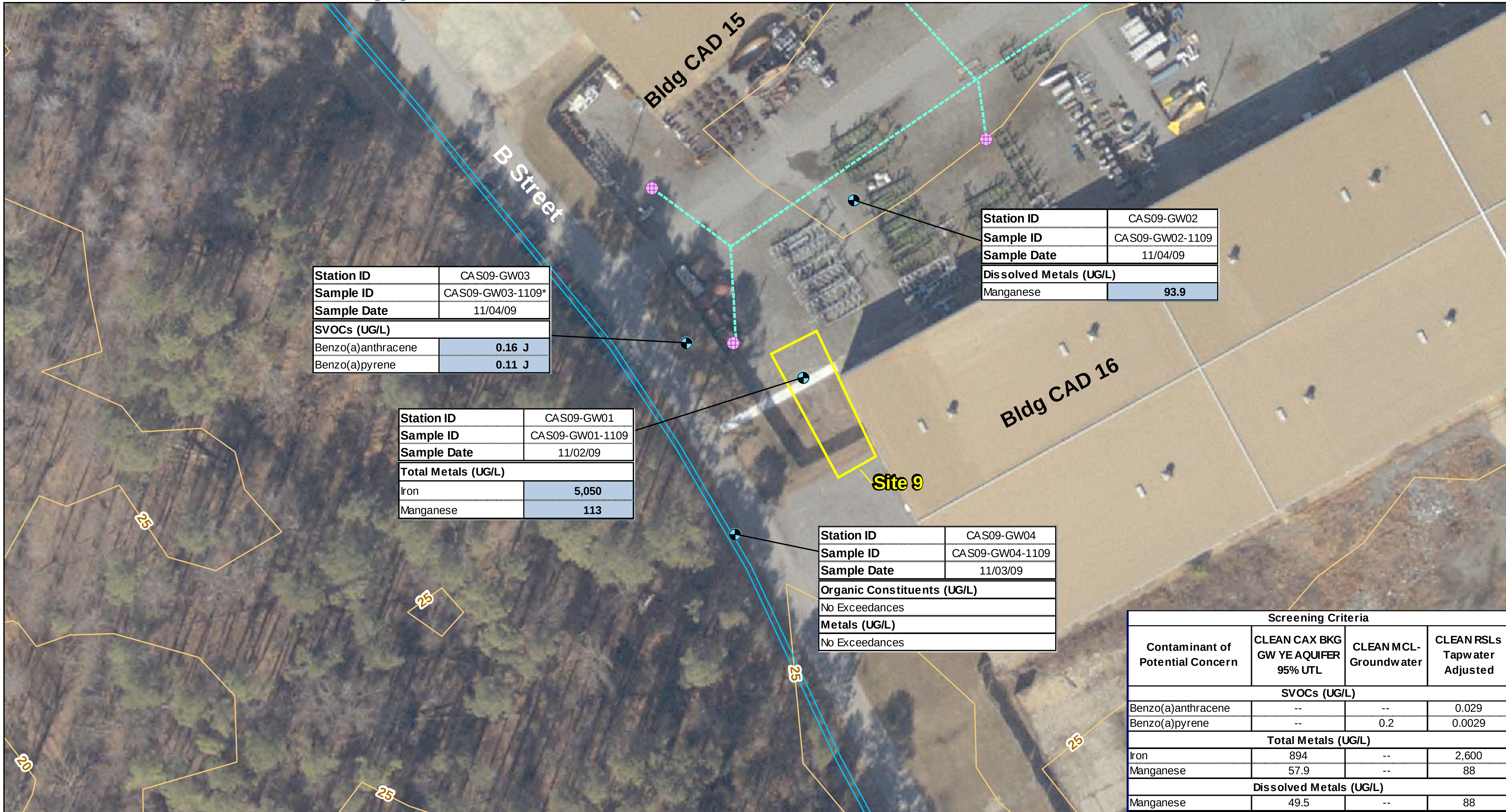
N

0 60 120 Feet

Figure 4-4
Site 9 Subsurface Soil Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE4-5_SITE9_GW.MXD MUNWIN 11/29/10



Station ID	CAS09-GW02
Sample ID	CAS09-GW02-1109
Sample Date	11/04/09
Dissolved Metals (UG/L)	
Manganese	93.9

Station ID	CAS09-GW03
Sample ID	CAS09-GW03-1109*
Sample Date	11/04/09
SVOCs (UG/L)	
Benzo(a)anthracene	0.16 J
Benzo(a)pyrene	0.11 J

Station ID	CAS09-GW01
Sample ID	CAS09-GW01-1109
Sample Date	11/02/09
Total Metals (UG/L)	
Iron	5,050
Manganese	113

Station ID	CAS09-GW04
Sample ID	CAS09-GW04-1109
Sample Date	11/03/09
Organic Constituents (UG/L)	
No Exceedances	
Metals (UG/L)	
No Exceedances	

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG GW YE AQUIFER 95% UTL	CLEAN MCL-Groundwater	CLEAN RSLs Tapwater Adjusted
SVOCs (UG/L)			
Benzo(a)anthracene	--	--	0.029
Benzo(a)pyrene	--	0.2	0.0029
Total Metals (UG/L)			
Iron	894	--	2,600
Manganese	57.9	--	88
Dissolved Metals (UG/L)			
Manganese	49.5	--	88

Legend

- 2009 SI Well Point Groundwater Sample Location
- Drop-In Box
- Study Area Boundary
- Drainage Channel
- Storm Water Line
- Storm Water Drainage Structure
- Culvert
- Elevation Contour (5 ft interval)

Exceeds BKG & MCL

Exceeds BKG & RSL

Exceeds BKG, MCL & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

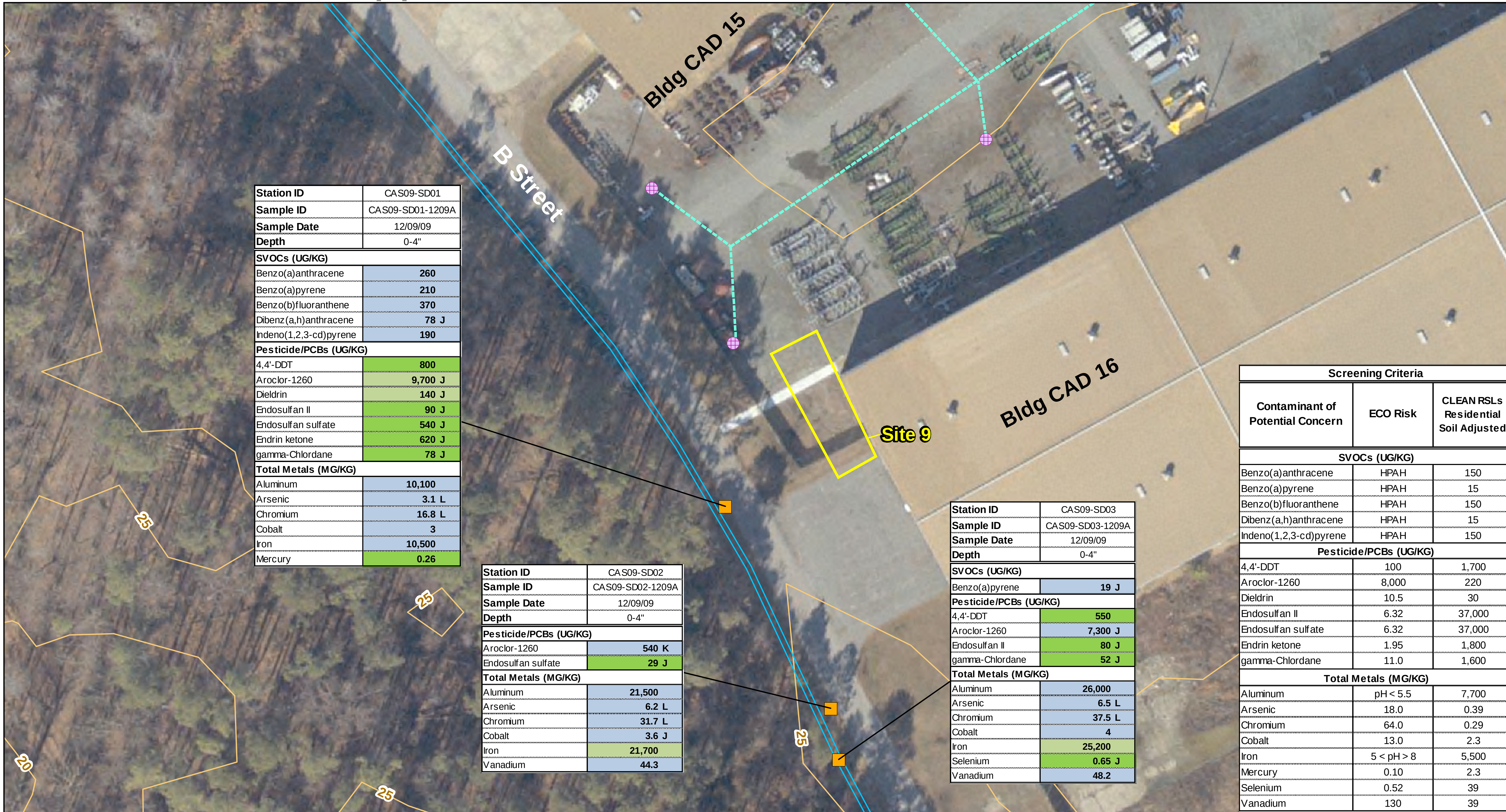
N

0 60 120 Feet

Figure 4-5
Site 9 Groundwater Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE4-6_SITE9_SD.MXD MUNWIN 11/29/10



Station ID	CAS09-SD01
Sample ID	CAS09-SD01-1209A
Sample Date	12/09/09
Depth	0-4"
SVOCs (UG/KG)	
Benzo(a)anthracene	260
Benzo(a)pyrene	210
Benzo(b)fluoranthene	370
Dibenz(a,h)anthracene	78 J
Indeno(1,2,3-cd)pyrene	190
Pesticide/PCBs (UG/KG)	
4,4'-DDT	800
Aroclor-1260	9,700 J
Dieldrin	140 J
Endosulfan II	90 J
Endosulfan sulfate	540 J
Endrin ketone	620 J
gamma-Chlordane	78 J
Total Metals (MG/KG)	
Aluminum	10,100
Arsenic	3.1 L
Chromium	16.8 L
Cobalt	3
Iron	10,500
Mercury	0.26

Station ID	CAS09-SD02
Sample ID	CAS09-SD02-1209A
Sample Date	12/09/09
Depth	0-4"
Pesticide/PCBs (UG/KG)	
Aroclor-1260	540 K
Endosulfan sulfate	29 J
Total Metals (MG/KG)	
Aluminum	21,500
Arsenic	6.2 L
Chromium	31.7 L
Cobalt	3.6 J
Iron	21,700
Vanadium	44.3

Station ID	CAS09-SD03
Sample ID	CAS09-SD03-1209A
Sample Date	12/09/09
Depth	0-4"
SVOCs (UG/KG)	
Benzo(a)pyrene	19 J
Pesticide/PCBs (UG/KG)	
4,4'-DDT	550
Aroclor-1260	7,300 J
Endosulfan II	80 J
gamma-Chlordane	52 J
Total Metals (MG/KG)	
Aluminum	26,000
Arsenic	6.5 L
Chromium	37.5 L
Cobalt	4
Iron	25,200
Selenium	0.65 J
Vanadium	48.2

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil Adjusted
SVOCs (UG/KG)		
Benzo(a)anthracene	HPAH	150
Benzo(a)pyrene	HPAH	15
Benzo(b)fluoranthene	HPAH	150
Dibenz(a,h)anthracene	HPAH	15
Indeno(1,2,3-cd)pyrene	HPAH	150
Pesticide/PCBs (UG/KG)		
4,4'-DDT	100	1,700
Aroclor-1260	8,000	220
Dieldrin	10.5	30
Endosulfan II	6.32	37,000
Endosulfan sulfate	6.32	37,000
Endrin ketone	1.95	1,800
gamma-Chlordane	11.0	1,600
Total Metals (MG/KG)		
Aluminum	pH < 5.5	7,700
Arsenic	18.0	0.39
Chromium	64.0	0.29
Cobalt	13.0	2.3
Iron	5 < pH > 8	5,500
Mercury	0.10	2.3
Selenium	0.52	39
Vanadium	130	39

Legend

- 2009 SI Sediment Sample Location
- Drop-In Box
- Study Area Boundary
- Drainage Channel
- Storm Water Line
- Storm Water Drainage Structure
- Culvert
- Elevation Contour (5 ft interval)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

N

0 60 120 Feet

Figure 4-6
Site 9 Surface Sediment Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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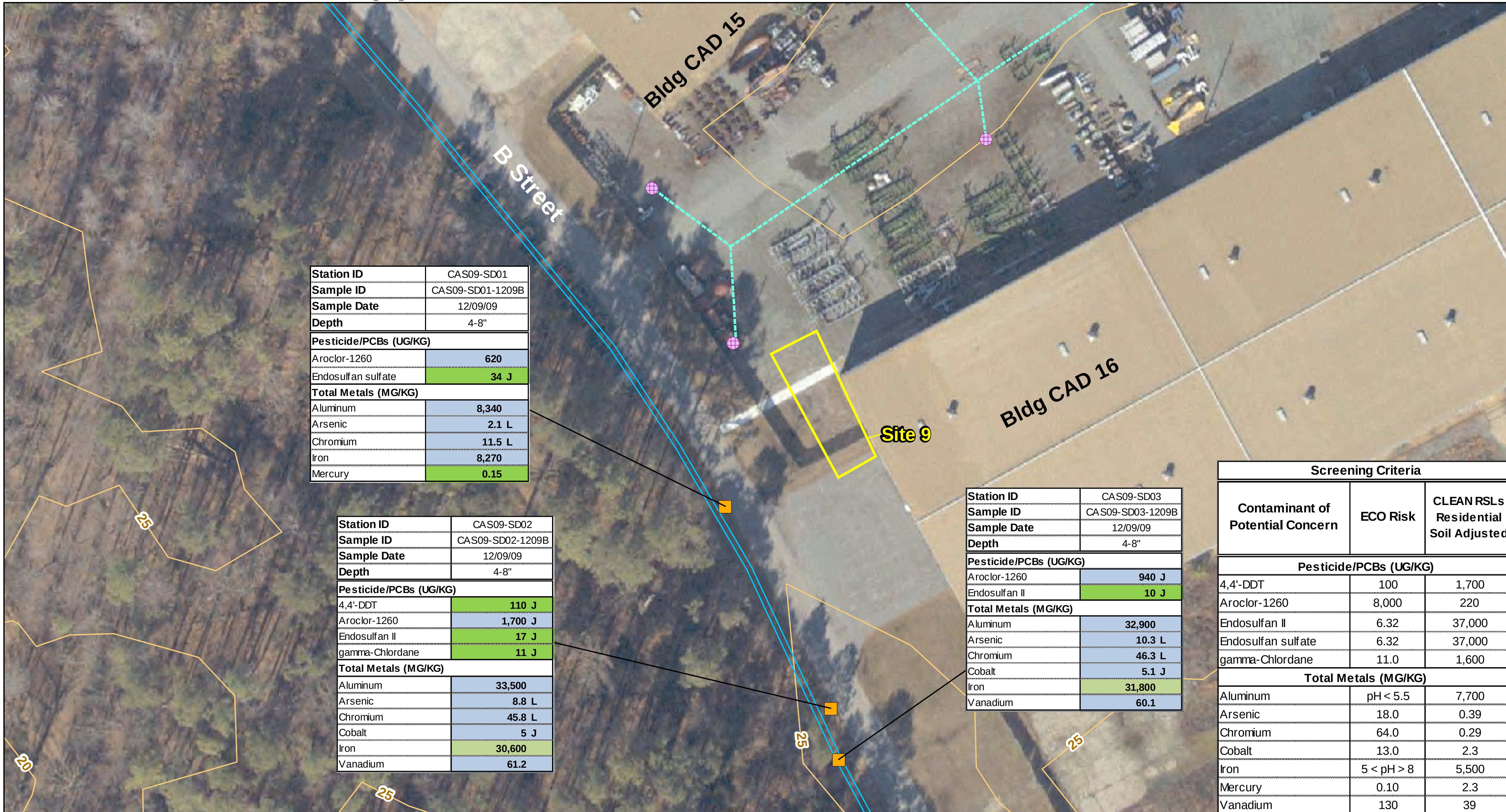

Station ID	CAS09-SD01
Sample ID	CAS09-SD01-1209B
Sample Date	12/09/09
Depth	4-8"
Pesticide/PCBs (UG/KG)	
Aroclor-1260	620
Endosulfan sulfate	34 J
Total Metals (MG/KG)	
Aluminum	8,340
Arsenic	2.1 L
Chromium	11.5 L
Iron	8,270
Mercury	0.15

Station ID	CAS09-SD02
Sample ID	CAS09-SD02-1209B
Sample Date	12/09/09
Depth	4-8"
Pesticide/PCBs (UG/KG)	
4,4'-DDT	110 J
Aroclor-1260	1,700 J
Endosulfan II	17 J
gamma-Chlordane	11 J
Total Metals (MG/KG)	
Aluminum	33,500
Arsenic	8.8 L
Chromium	45.8 L
Cobalt	5 J
Iron	30,600
Vanadium	61.2

Station ID	CAS09-SD03
Sample ID	CAS09-SD03-1209B
Sample Date	12/09/09
Depth	4-8"
Pesticide/PCBs (UG/KG)	
Aroclor-1260	940 J
Endosulfan II	10 J
Total Metals (MG/KG)	
Aluminum	32,900
Arsenic	10.3 L
Chromium	46.3 L
Cobalt	5.1 J
Iron	31,800
Vanadium	60.1

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil Adjusted
Pesticide/PCBs (UG/KG)		
4,4'-DDT	100	1,700
Aroclor-1260	8,000	220
Endosulfan II	6.32	37,000
Endosulfan sulfate	6.32	37,000
gamma-Chlordane	11.0	1,600
Total Metals (MG/KG)		
Aluminum	pH < 5.5	7,700
Arsenic	18.0	0.39
Chromium	64.0	0.29
Cobalt	13.0	2.3
Iron	5 < pH > 8	5,500
Mercury	0.10	2.3
Vanadium	130	39

Legend
- 2009 SI Sediment Sample Location
- Drop-In Box
- Study Area Boundary
- Drainage Channel
- Storm Water Line
- Storm Water Drainage Structure
- Culvert
- Elevation Contour (5 ft interval)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

N

0 60 120 Feet

Figure 4-7
Site 9 Subsurface Sediment Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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SECTION 5

AOC 3—Cheatham Annex Depot 11/12 Pond Bank

This section presents an evaluation of the results from the SI performed at AOC 3. The section includes a summary of the previous investigations conducted at the site, the conceptual site model, and the release assessment decision analysis.

5.1 History of Investigations

With the exception of one surface/subsurface soil sample (CAS004-HA06) and one Upstream Pond sediment sample (CAS004-SD01) collected as part of the *Final Site Inspection Report Site 4 and AOC 1* (Baker, 2001a), there has been no sampling associated with AOC 3 prior to the 2009 SI field activities.

5.2 Conceptual Site Model

The conceptual site model for AOC 3 is based on the data collected as part of the previous investigations and the SI. The conceptual site model interprets the physical characteristics, the distribution of contamination and potential contaminant source, potential migration pathways, and the potential exposure and receptor pathways. The conceptual site model for AOC 3 is shown in **Figure 3-2.**

5.2.1 Site History and Potential Sources of Release

The history of this site is unknown. A 1955 aerial photograph shows ground scarring and indicates that this area was disturbed in the past and presents the potential for buried debris to exist. The proximity and orientation of the ground scarring suggests that this disturbed area may have been related to operations at Building CAD 12, a storage warehouse. The relationship of the 1955 disturbed area is shown on **Figure 2-9**.

A surface debris pile with approximate dimensions of 20 feet by 20 feet by 10 feet high is located in the southwest corner of AOC 3 and adjacent to the Upstream Pond. The surface debris pile contains metal banding, a few empty drums, and charred wood.

2009 Site Inspection Activities

AOC 3 investigation activities include test pit excavation, surface and subsurface soil sampling, groundwater well point installation, groundwater well development and sampling, well point abandonment, and surface water and sediment sampling. An explanation for each activity and methods of sample collection are documented in Section 2, Investigation Methodology.

5.2.2 Physical Setting

Topography and Surface Water

AOC 3 is approximately one acre in size and located between Buildings CAD 11 and CAD 12, northwest and adjacent to the Upstream Pond. The topography in the area slopes northeast towards Upstream Pond (**Figure 5-1**). The area is heavily vegetated with shrubs and trees.

Surface runoff from the areas surrounding building CAD 12 flows through this area and into Upstream Pond. Surface water in Upstream Pond flows through a culvert under D Street and into Youth Pond. The spatial relationship of this site to Sites 4 and 9, as well as the presumed directions of groundwater and surface water flow, are illustrated in the CSM (**Figures 3-1 and 3-2**).

Hydrogeology

In general, soil at AOC 3 is predominately yellowish-brown sandy clay and clay underlain by greenish-grey silty sand. Soil boring logs from the SI field activities present descriptions of the soil and general subsurface geology, and are included as **Appendix E**.

The shallow aquifer underlying AOC 3 is the Yorktown Eastover Aquifer, and during the SI field activities, groundwater was encountered between approximately 1.5 and 11.5 feet bgs. Groundwater is estimated to flow north-northeast towards Upstream Pond.

Current and Future Land Use

AOC 3 is currently a wooded area between CAD buildings 11 and 12. While AOC 3 is located within the restricted CAD area, access is not restricted to CAX visitors (e.g., civilian employees and military personnel) since the gate along D Street near CAD Building 11 is no longer locked on a regular basis. Future land use at AOC 3 is not expected to change and will likely continue as a wooded area in the foreseeable future.

5.2.3 Distribution of Contamination

Data collected during the 2009 SI field activities were evaluated as part of this SI Report (**Figure 5-1**). **Tables 5-1** through **Table 5-6** summarize all constituents detected in AOC 3 soil, groundwater, sediment, and surface water. Additional surface water and sediment samples associated with Site 4 were collected from Upstream Pond during this investigation. These results are used to evaluate the pond as a whole and are discussed in this section. The tables also identify screening criteria exceedances. All analytical data for the SI samples are provided in **Appendix I**.

Buried Debris

Test pitting activities were conducted between October 27 and October 30, 2009 to determine if buried debris was present within the footprint of a ground scar observed in a 1955 aerial photograph (**Figure 2-9**). Once buried debris was encountered, additional test pits were excavated to determine the extent of buried debris at AOC 3. When buried material was encountered within a given test pit, additional test pits were advanced at locations radiating outward from the original test pit location to determine the vertical and horizontal extent of waste. In total, 24 test pits were advanced at AOC 3 (locations CAA03-TP01 through CAA03-TP24 [**Figure 5-2]**). Test pitting was discontinued when all peripheral test pits were found to be free of debris or the edge of Upstream Pond was reached. Buried debris was encountered along the edge of Upstream Pond, therefore the southeastern and eastern boundaries were not delineated.

Buried debris was encountered between the ground surface and depths greater than 8 feet bgs. The maximum vertical extent of buried debris could not be determined in several test pits because either the depth of buried debris was greater than the maximum excavation depth of the equipment used or buried debris was encountered below the water table and further excavation could not be conducted.

Buried debris included asphalt, bricks, concrete, metal, construction and wood debris, automotive parts, dark tar paper, shingles, and a 55-gallon drum. Test pit logs and associated photographs are provided within **Appendices C** and **D** of this report, respectively. The estimated horizontal extent of buried debris at AOC 3 is depicted in **Figure 5-2**.

Soil

In total, 11 surface soil and 15 subsurface soil samples were collected from AOC 3 (**Table 2-1**) during the Site 4 1999 field investigation (CAS004-4HA06) and the 2009 SI field activities (CAA03-SS/SB01 though CAA03-SS/SB10). Four of the 15 subsurface soil samples, collected during the 2009 SI field activities, were co-located with other subsurface samples. Sample locations were chosen to best represent the areas within the identified scarring area, areas within known buried debris from the test pit investigation, as well as peripheral areas in order to fill any test pit investigation data gaps.

Soil samples collected during the Site 4 1999 field investigation were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), TCL explosives, TAL metals and cyanide. Soil samples collected during the 2009 SI field activities were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, TAL total metals, cyanide, TOC, pH, and grain size.

Volatile Organic Compounds

Two VOCs (chloroform and methylene chloride) exceeded at least one screening criterion in surface soil samples (**Figure 5-3**). Four VOCs (benzene, chloroform, ethylbenzene, and methylene chloride) exceeded at least one screening criterion in subsurface soil samples (**Figure 5-4**).

Chloroform and methylene chloride are common laboratory contaminants and are not likely site-related.

Although benzene and ethylbenzene were detected above the SSL in CAA03-SB05, this sample was not collected in the shallow subsurface soil, but rather in deeper subsurface soil (15.1-15.6 feet bgs).

Semivolatile Organic Compounds

Twenty-one SVOCs (3- and 4-methylphenol, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, PAH (HMW), PAH (LMW), phenanthrene, and pyrene) exceeded at least one screening criterion in surface soil samples (**Figure 5-3**). Eleven SVOCs (2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, hexachlorobenzene, indeno(1,2,3-cd)pyrene, and naphthalene) exceeded at least one screening criterion in subsurface soil samples (**Figure 5-4**).

SVOCs were detected in surface soil throughout AOC 3. However, most of the SVOCs exceeding the screening criteria were detected in the upgradient surface soil sample, CAA03-SS06. The most commonly detected SVOCs were the HMW PAHs.

SVOCs were detected in subsurface soil throughout AOC 3. The most commonly detected SVOCs were the HMW PAHs.

Pesticides/Polychlorinated Biphenyls

Ten pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, delta-BHC, dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, and gamma-BHC [Lindane]) exceeded at least one screening criterion in surface soil samples (**Figure 5-3**). Nine pesticides (4,4'-DDD, 4,4'-DDE, aldrin, delta-BHC, dieldrin, endosulfan sulfate, endrin, gamma-BHC (Lindane), and gamma-Chlordane) exceeded at least one screening criterion in subsurface soil samples (**Figure 5-4**).

Pesticides were not known to be disposed of at AOC 3. Detected concentrations are likely attributable to normal pesticide use at DoD facilities to control pests and weeds. The legal application of pesticides is not CERCLA-regulated.

One PCB, Aroclor-1260, exceeded at least one screening criterion in this surface soil sample (**Figure 5-3**).

Although Aroclor-1260 exceeded the 24 µg/kg SSL in surface soil sample CAS004-4HA06 (concentration of 91 µg/kg), it was not detected in groundwater at the AOC.

Explosives

No explosives were detected in surface and subsurface soil.

Inorganic Constituents

Twelve inorganics (aluminum, arsenic, chromium, copper, iron, lead, mercury, nickel, selenium, silver, thallium, and zinc) exceeded at least one screening criterion in surface soil samples (**Figure 5-5**). Ten inorganics (aluminum, antimony, arsenic, chromium, cobalt, manganese, selenium, silver, vanadium, and zinc) exceeded at least one screening criterion in subsurface soil samples (**Figure 5-6**).

Seven of the inorganics that exceeded their respective screening criterion were detected in surface soil sample CAS004-4HA06, collected from within the boundary of the surface debris pile.

Six of the inorganics that exceeded their respective screening criterion were detected in subsurface soil sample CAA03-SB02, collected from the deep subsurface soil (15.5 to 16 feet bgs).

Groundwater

Groundwater samples were collected from five well points (CAA03-GW01 through CAA03-GW05) during the 2009 SI field activities (**Table 2-1**). Since no groundwater samples had previously been collected from AOC 3, the well point locations were placed within the identified scarring area, the area of known buried debris from the test pit investigation, as well as peripheral areas in order to best characterize groundwater across the entire site.

All groundwater samples were analyzed for TCL Organics (VOCs, SVOCs, pesticides/ PCBs), SIM PAHs, and TAL total and dissolved metals, mercury, and cyanide.

Volatile Organic Compounds

Four VOCs (1,4-dichlorobenzene, benzene, ethylbenzene, and total xylenes) exceeded at least one screening criterion in groundwater samples (**Figure 5-7**).

Although 1,4-dichlorobenzene, benzene, ethylbenzene, and total xylenes exceeded their respective tapwater RSLs (0.43 μg/L, 0.41 μg/L, 1.5 μg/L, and 20 μg/L, respectively) only benzene in CAA03-GW05 (14 μg/L) also exceeded the MCL (5 μg/L).

Semivolatile Organic Compounds

Nine SVOCs (2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, dibenzofuran, indeno(1,2,3-cd)pyrene, and naphthalene) exceeded at least one screening criterion in groundwater samples (**Figure 5-7**).

All SVOC exceedances were detected in monitoring wells located within or downgradient of the estimated extent of buried waste. The most detected SVOCs were the HMW PAHs.

Pesticides/Polychlorinated Biphenyls

One pesticide, dieldrin, exceeded one or more screening criteria for groundwater (**Figure 5-7**).

Pesticides were not known to be disposed of at AOC 3. Detected concentrations are likely attributable to normal pesticide use at DoD facilities to control pests and weeds. The legal application of pesticides is not CERCLA-regulated.

No PCBs were detected in the groundwater samples.

Inorganic Constituents

Seven total inorganics (aluminum, arsenic, chromium, iron, manganese, mercury, and vanadium) exceeded at least one screening criterion in groundwater samples (**Figure 5-7**). Four dissolved inorganics (arsenic, cobalt, iron, and manganese) exceeded at least one screening criterion in groundwater samples (**Figure 5-7**).

Although seven total inorganics exceeded screening criteria in groundwater, aluminum, chromium, mercury, and vanadium did not exceed screening criteria in the dissolved fraction. Arsenic, iron, and manganese exceeded screening criteria in both total and dissolved groundwater samples.

The one dissolved cobalt exceedance (1.1J μg/L) was only slightly higher than the background concentration of 0.7 μg/L.

Surface Water (Upstream Pond)

In total, eight surface water samples were collected from Upstream Pond (**Table 2-1**) during the 2009 SI field activities (CAS04-SW01 through CAS04-SW04 and CAA03-SW01 through

CAA03-SW04). Locations were placed within the northern portion of the Upstream Pond where contaminant impacts from Site 4 and AOC 3 were most likely.

All sediment samples were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, TAL total metals, cyanide, TOC, pH, and grain size.

Volatile Organic Compounds
No VOCs were detected in surface water samples.

Semivolatile Organic Compounds
Two SVOCs (benzo(a)pyrene and pyrene) exceeded at least one screening criterion in surface water (**Figure 5-8**).

Benzo(a)pyrene and pyrene exceeded their respective screening criterion in two surface water samples, CAS04-SW03 and CAS04-SW04. These surface water samples were collected from opposite ends of Upstream Pond (upstream and downstream directions).

Pesticides/Polychlorinated Biphenyls
No pesticides or PCBs were detected in surface water samples.

Inorganic Constituents
Seven total inorganics (aluminum, arsenic, barium, cadmium, copper, iron, and manganese) exceeded at least one screening criterion in surface water samples (**Figure 5-8**). One dissolved inorganic, barium, exceeded at least one screening criterion in all surface water samples (**Figure 5-8**).

All seven inorganics exceeding their respective screening criterion were detected in upstream surface water sample CAS04-SW03, located between the outfalls of the two Site 4 drainage ditches.

Dissolved barium was detected in all surface water samples at a maximum concentration of 25.5 µg/L in surface water sample CAA03-SW02.

Sediment (Upstream Pond)

In total, 12 surface and subsurface sediment samples were collected from Upstream Pond (**Table 2-1**) during the Site 4 1999 field investigation (CAS004-4SD01 through CAS004-4SD04) and during the 2009 SI field activities (CAA03-SD01 through CAA03-SD04 and CAS04-SD01 through CAS04-SD04). Surface sediment samples were collected from 0-4 inches bgs while subsurface sediment sample locations were collected from 4-8 inches bgs. The sediment sample locations were chosen to best represent depositional areas where contaminants are likely to have settled after being transported from Site 4 and AOC 3.

Sediment samples collected during the Site 4 1999 field investigation were analyzed for TCL organics (VOCs, SVOCs, pesticides/PCBs), TCL explosives, TAL metals and cyanide. Sediment samples collected during the 2009 SI field activities were analyzed for TCL Organics (VOCs, SVOCs, pesticides/PCBs), SIM PAHs, TAL total metals, cyanide, TOC, pH, and grain size.

Volatile Organic Compounds
One VOC, carbon disulfide, exceeded at least one screening criterion in surface sediment (**Figure 5-9**). No VOCs were detected above any screening criteria in subsurface sediment.

Carbon disulfide is naturally occurring in swampy areas; therefore, it is likely not related to a site release. In addition, carbon disulfide was not detected in any other site media.

Semivolatile Organic Compounds

Eighteen SVOCs (acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, flourene, indeno(1,2,3-cd)pyrene, naphthalene, PAH (HMW), PAH (LMW), PAH (total), phenanthrene, and pyrene) exceeded at least one screening criterion in surface sediment samples (**Figure 5-9**). Eleven SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) exceeded at least one screening criterion in subsurface sediment samples (**Figure 5-10**).

With the exception of one surface sediment sample (CAS04-SD01), SVOCs were detected in all surface sediment samples collected from Upstream Pond.

In subsurface sediment, SVOCs were primarily detected in the samples collected from the perimeter of Upstream Pond.

Pesticides/Polychlorinated Biphenyls

Twelve pesticides (4,4′-DDD, 4-4′-DDE, 4-4′-DDT, alpha-Chlordane, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, gamma-chlordane, and heptachlor epoxide) exceeded at least one screening criterion in surface sediment samples (**Figure 5-9**). Eleven pesticides (4,4′-DDD, 4-4′-DDE, 4-4′-DDT, alpha-Chlordane, dieldrin, endosulfan I, endosulfan II, endrin, endrin aldehyde, gamma-Chlordane, and heptachlor epoxide) exceeded at least one screening criterion in subsurface sediment samples (**Figure 5-10**).

Pesticides were not known to be disposed of at either Site 4 or AOC 3. Detected concentrations are likely attributable to normal pesticide use at DoD facilities to control pests and weeds. The legal application of pesticides is not CERCLA-regulated.

Two PCBs (Aroclor-1254 and Aroclor-1260) exceeded at least one screening criterion in surface and subsurface sediment samples (**Figures 5-9** and **5-10**).

Aroclor-1254 exceeded the adjusted residential RSL and ecological screening criteria (1,100 µg/kg and 59.8 µg/kg, respectively) in one surface sediment sample, CAS04-SD03, at a concentration of 21,000 µg/kg. In subsurface sediment, Aroclor-1254 exceeded the adjusted residential RSL (1,100 µg/kg) and ecological screening criteria (59.8 µg/kg) in one subsurface sediment sample, CAS04-SD03, at a concentration of 8,900 µg/kg.

In surface sediment, Aroclor-1260 exceeded the ecological risk screening criteria in eight of the twelve surface sediment samples at a maximum concentration of 1,200 µg/kg. These samples are located throughout Upstream Pond. In subsurface sediment samples, Aroclor-1260 exceeded the ecological screening criteria in four of the 12 subsurface sediment samples at a maximum concentration of 580 µg/kg. These samples are located just off the eastern edge of the AOC 3 banding pile and along the southern boundary of Upstream Pond.

Inorganic Constituents
Eleven inorganics (arsenic**,** barium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc) exceeded at least one screening criterion in surface sediment samples (**Figure 5-11**). Twelve inorganics (aluminum, arsenic**,** barium, cadmium, chromium, copper, iron, lead, nickel, silver, vanadium, and zinc) exceeded at least one screening criterion in subsurface sediment samples (**Figure 5-12**).

5.2.4 Potential Exposure and Receptor Pathways

Potential receptors at AOC 3 include current/potential future industrial workers, current/potential future trespassers, potential future construction workers, potential future residents, animals (i.e., birds and mammals), terrestrial organisms (i.e., soil invertebrates, reptiles, amphibians), aquatic organisms (i.e., benthic and aquatic invertebrates, fish, reptiles, amphibians) and terrestrial, wetland and aquatic plants.

Human Health Risk Evaluation

The human health risk screening/risk-ratio evaluation for AOC 3 is presented in **Appendix A**. The supporting tables for the evaluation are presented in **Appendix A, Attachment A.3**. An overview of the potential receptors and exposure pathways addressed in the risk evaluation is presented in **Figure A-1** of **Appendix A**. The results of the evaluation for AOC 3 are summarized below.

Surface Soil
The risk-based screening/risk ratio evaluation for surface soil at AOC 3 is provided in **Appendix A, Attachment A.3, Tables 2.1** through **2.1b**.

In Step 1, eighteen constituents were detected in surface soil samples at concentrations above background and/or the human health screening levels, and were selected as COPCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, pyrene, dibenzofuran, dieldrin, gamma-BHC, aluminum, arsenic, chromium iron, and lead.

The average lead concentration in surface soil is 97 mg/kg, which is less than the lead screening level. Therefore, lead is not considered to be present at a concentration of potential concern, and lead was eliminated as a COPC.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 1×10^{-2} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs ranged from 0.04 to 1; one of eight HI values were greater than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk or a cumulative target organ HI greater than 0.5 were identified as COPCs, and included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, gamma-BHC, arsenic, chromium, and iron.

In Step 3, based on the use of the 95 percent UCL for the EPCs, a cumulative cancer risk of 1×10^{-2} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. The cumulative target organ HI calculated for the COPCs is 0.5; this HI value was equal to the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk were selected as COPCs, and included: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, gamma-BHC, arsenic, and chromium.

Screening criteria were not available for carbazole and thallium. Therefore, potential risks could not be evaluated for these constituents.

Exposure to surface soil at AOC 3 may result in unacceptable human health risks associated with PAHs, dieldrin, gamma-BHC, arsenic, and chromium, based on potential human exposure.

Subsurface Soil

The risk-based screening/risk ratio evaluation for subsurface soil at Site 9 is provided in Appendix **A, Attachment A.3, Tables 2.2** through **2.2b**.

In Step 1, 13 constituents were detected in subsurface soil samples at concentrations above background (for metals, pesticides, and phthalates) and the human health screening levels, and were identified as COPCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, aluminum, arsenic, chromium, cobalt, manganese, and vanadium.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 4×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs ranged from 0.1 to 0.6; one of five HI values was greater than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk or the cumulative target organ HI were identified as COPCs, and included: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, aluminum, arsenic, chromium, and manganese.

In Step 3, based on the use of the 95 percent UCL for the EPCs, a cumulative cancer risk of 2×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. The cumulative target organ HIs calculated for the COPCs were 0.2 and 0.3; these HI values were less than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk were selected as COPCs, and included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, arsenic, and chromium.

Screening criteria were not available for methylcyclohexane and carbazole. Therefore, potential risks could not be evaluated for these constituents.

Exposure to surface soil at AOC 3 may result in unacceptable human health risks, primarily associated with PAHs, arsenic, and chromium, based on potential human exposure.

Groundwater

The risk-based screening/risk ratio evaluation for groundwater at AOC 3 is provided in **Appendix A, Attachment A.3, Tables 2.3** through **2.3b**.

In Step 1, 22 constituents were detected in groundwater samples at concentrations above background and/or the human health screening levels, and were identified as COPCs: 1,4-dichlorobenzene, benzene, ethylbenzene, m,p-xylene, xylene (total), 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dibenzofuran, dieldrin, aluminum, arsenic, chromium, iron, manganese, mercury, and vanadium.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 7×10^{-3} was calculated; this value greater than the 5×10^{-5} risk-ratio screening benchmark. Cumulative target organ HIs calculated for the COPCs ranged from 0.2 to 1; three of seven HI values were greater than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk or a cumulative target organ HI greater than 0.5 were identified as COPCs, and included: 1,4-dichlorobenzene, benzene, ethylbenzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, aluminum, arsenic, chromium, iron, and manganese.

In Step 3, based on the use of the 95 percent UCL for the EPCs, a cumulative cancer risk of 7×10^{-3} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. The cumulative target organ HIs calculated for the COPCs were 0.5 and 1; one HI value was greater than the cumulative target organ HI risk-ratio screening benchmark of 0.5. Constituents contributing to the cumulative cancer risk or a cumulative target organ HI greater than 0.5 were selected as COPCs, and included: 1,4-dichlorobenzene, benzene, ethylbenzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, aluminum, arsenic, chromium, iron, and manganese.

Screening criteria were not available for methylcyclohexane and carbazole. Therefore, potential risks could not be evaluated for these constituents.

Exposure to groundwater at AOC 3 may result in unacceptable human health risks associated with VOCs, PAHs, and metals based on potential human exposure.

Indoor Air (Vapor Intrusion from Groundwater)

The risk-based screening/risk ratio evaluation for indoor at AOC 3 is provided in **Appendix A,** Attachment **A.3, Table 2.4**. The Step 2 and Step 3 risk ratio evaluations were not conducted for the vapor intrusion evaluation. The exceedance of vapor intrusion screening levels is an indication that further evaluation (e.g., multiple lines of evidence investigation) may be warranted.

Three constituents were detected in groundwater samples above the vapor intrusion screening levels, and were identified as COPCs: benzene, ethylbenzene, and naphthalene.

Screening criteria were not available for the following constituents: cyclohexane, methylcyclohexane, 1,1-biphenyl, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzaldehyde, dibenzofuran, fluorene, phenanthrene, and pyrene. Therefore, potential risks could not be evaluated for these constituents.

Exposure to indoor air at AOC 3 may result in unacceptable human health risks associated with benzene, ethylbenzene, and naphthalene, based on potential human exposure.

Surface Water (Upstream Pond)

The risk-based screening/risk ratio evaluation for surface water in Upstream Pond adjacent to Site 4 and AOC 3 is provided in **Appendix A, Attachment A.3, Tables 2.5** through **2.5b**.

In Step 1, two constituents were detected in surface water samples above the human health screening levels, and were identified as COPCs: benzo(a)pyrene and arsenic.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 3×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene and arsenic.

In Step 3, based on the use of the 95 percent UCL for the EPC, a cumulative cancer risk of 3×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene and arsenic. Arsenic was the only COPC to contribute an individual cancer risk above $5x10^{-5}$.

Exposure to surface water in Upstream Pond adjacent to Site 4 and AOC 3 may result in unacceptable human health risks associated with benzo(a)pyrene and arsenic, based on potential human exposure. The potential unacceptable carcinogenic risk is primarily associated with arsenic; however, arsenic was only detected in one of the eight surface water samples. Benzo(a)pyrene alone does not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$.

Sediment (Upstream Pond)

The risk-based screening/risk ratio evaluation for surface and subsurface sediment in Upstream Pond adjacent to Site 4 and AOC 3 is provided in **Appendix A, Attachment A.3, Tables 2.6** through **2.7b**.

In Step 1, nine constituents were detected in surface sediment (0-4 inches) above the human health screening levels, and were identified as COPCs: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1254, dieldrin, heptachlor epoxide, arsenic, and chromium.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 8×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1254, dieldrin, heptachlor epoxide, arsenic, and chromium.

In Step 3, based on the use of the 95 percent UCL for the EPC, a cumulative cancer risk of 5×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1254, dieldrin, heptachlor epoxide, arsenic, and chromium.

Methylcyclohexane, carbazole, and thallium did not have any available screening criteria; potential risks associated with these constituents could not be evaluated.

Exposure to surface sediment in Upstream Pond adjacent to Site 4 and AOC 3 may result in unacceptable human health risks associated with PAHs, pesticide/PCBs, and metals, based on potential human exposure.

In Step 1, five constituents were detected in subsurface sediment (4-8 inches) above the human health screening levels, and were identified as COPCs: benzo(a)pyrene, Aroclor-1254, dieldrin, arsenic, and chromium.

In Step 2, based on the maximum detected concentration for each COPC, a cumulative cancer risk of 3×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene, Aroclor-1254, dieldrin, arsenic, and chromium.

In Step 3, based on the use of the 95 percent UCL for the EPC, a cumulative cancer risk of 2×10^{-4} was calculated; this value is greater than the 5×10^{-5} risk-ratio screening benchmark. Constituents contributing to the cumulative cancer risk were identified as COPCs, and included: benzo(a)pyrene, Aroclor-1254, dieldrin, arsenic, and chromium.

Methylcyclohexane and thallium did not have any available screening criteria; potential risks associated with these constituents could not be evaluated.

Exposure to subsurface sediment in Upstream Pond adjacent to Site 4 and AOC 3 may result in unacceptable human health risks associated with benzo(a)pyrene, Aroclor-1254, dieldrin, arsenic, and chromium, based on potential human exposure.

Ecological Risk Evaluation

The ecological risk screening was performed to determine the potential for ecological risks associated with direct exposure to site media at AOC 3 (surface and subsurface soils) and in Upstream Pond (surface water, and surface and subsurface sediment). The results of the ecological risk screening (**Appendix B**) provide a preliminary indication of potential risks from exposure to COPCs identified for the site, and are used to help determine whether the site requires further evaluation or if the risks are acceptable. **Table B-4** lists the samples used in this evaluation and the spatial groupings.

Surface Soil

Ten metals (aluminum, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, and zinc), six pesticides (dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, and lindane), 3- and 4-methylphenol, LMW PAHs, and HMW PAHs exceeded screening values based upon maximum detected concentrations (**Tables B-27** and **B-28**). All of these chemicals, except manganese, also exceeded background UTLs, where available. Screening values and background UTLs were not available for 2-butanone, acetone, benzaldehyde, carbazole, and dibenzofuran. Therefore, aluminum, copper, iron, lead, mercury, nickel, selenium, thallium, zinc, dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, lindane, 3- and 4-methylphenol, LMW PAHs, HMW PAHs, 2-butanone, acetone, benzaldehyde, carbazole, and dibenzofuran were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- Acetone and 2-butanone, which did not have screening values, were detected at maximum concentrations (640 and 24.0 µg/kg, respectively) that were less than soil screening values for other, similar VOCs (**Table B-1**). Therefore, these two chemicals were not identified as refined COPCs.
- Benzaldehyde, which also did not have a screening value, was detected at a maximum concentration (200 µg/kg) that was less than soil screening values for other, similar SVOCs (**Table B-1**). Therefore, this chemical was not identified as a refined COPC.
- Carbazole and dibenzofuran were detected in 10 and one (of 11) surface soil samples, respectively, at maximum concentrations of 120,000 and 19,000 µg/kg (120 and 19.0 mg/kg), respectively. While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to these two chemicals, available data suggest that the maximum observed concentration of dibenzofuran, but not carbazole, are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). Comparable values for dibenzofuran were 400 and 130 mg/kg, respectively. In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole and 50 and 23 mg/kg, respectively, for dibenzofuran (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg for carbazole and 4.60 mg/kg for dibenzofuran. Maximum surface soil concentrations for both carbazole and dibenzofuran were above these effects concentrations. Therefore, carbazole and dibenzofuran were identified as refined COPCs.
- The mean HQs for aluminum, copper, iron, lead, mercury, nickel, selenium, thallium, zinc, endosulfan sulfate, and 3- and 4-methylphenol were less than one. Therefore, these 11 chemicals were not identified as refined COPCs.
- The mean HQ exceeded one for dieldrin (5.78), endosulfan I (31.8), endrin (11.2), endrin aldehyde (2.97), lindane (10.3), LMW PAHs (4.09), and HMW PAHs (7.25). These seven chemicals (plus the individual PAH compounds that comprise the LMW and HMW PAH groups) were identified as refined COPCs.

Subsurface Soil

Four metals (aluminum, iron, manganese, and zinc) and three pesticides (endosulfan sulfate, endrin, and gamma-chlordane) exceeded screening values based upon maximum detected concentrations (**Tables B-29** and **B-30**). All of these chemicals, except iron, also exceeded background UTLs, where available. Acetone, carbazole, and dibenzofuran lacked both screening values and background UTLs. Therefore, aluminum, manganese, zinc, endosulfan sulfate, endrin, gamma-chlordane, acetone, carbazole, and dibenzofuran were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (240 µg/kg) that was less than soil screening values for other, similar VOCs (**Table B-1**). Therefore, this chemical was not identified as a refined COPC.
- Carbazole and dibenzofuran were detected in five and two (of 11) subsurface soil samples, respectively, at maximum concentrations of 650 and 350 µg/kg (0.650 and 0.350 mg/kg), respectively. While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to these two chemicals, available data suggest that the maximum observed concentrations of these two chemicals are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). Comparable values for dibenzofuran were 400 and 130 mg/kg, respectively. In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole and 50 and 23 mg/kg, respectively, for dibenzofuran (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg for carbazole and 4.60 mg/kg for dibenzofuran. Maximum surface soil concentrations for carbazole and dibenzofuran were below these effects concentrations. Therefore, these two chemicals were not identified as refined COPCs.
- The mean HQs for aluminum, manganese, zinc, endosulfan sulfate, and gamma-chlordane were less than one. Therefore, these chemicals were not identified as refined COPCs.
- The mean HQ exceeded one for endrin (6.15). This chemical was identified as a refined COPC.

Terrestrial Food Web

HQs based upon maximum exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-31** (calculations are included in **Appendix B**). Based upon a comparison to NOAELs, arsenic, cadmium, chromium, lead, mercury, selenium, silver, zinc, Aroclor-1260, dieldrin, endosulfan I, endrin, and 11 PAHs had HQs exceeding one for one or more receptors. Therefore, these 23 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- HQs based upon 95 percent UCL exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-32** (calculations are included in **Appendix B**). Based upon a comparison to NOAELs, dieldrin, chrysene, and pyrene had HQs exceeding one for at least one receptor. There were no exceedances based upon the LOAEL but one exceedance (for dieldrin) based upon the MATC.
- HQs based upon arithmetic mean exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-33** (calculations are included in **Appendix B**). Dieldrin had

HQs exceeding one based upon the NOAEL. No chemical had a HQ that exceeded one based upon the MATC or LOAEL.

Because there were no exceedances based upon the MATC or LOAEL for the mean exposure scenario, no refined COPCs were identified for terrestrial food web exposures and risks from this exposure pathway are considered acceptable.

Upstream Pond

Surface Water

Six metals (aluminum, barium, cadmium, copper, iron, and manganese) exceeded screening values based upon maximum detected concentrations in unfiltered samples (**Tables B-18** and **B-19**). Aluminum and copper were not detected in filtered samples. Only barium exceeded screening values based upon maximum detected concentrations in filtered samples. Benzo(a)pyrene and pyrene also exceeded screening values and were identified as initial COPCs. A screening value was not available for chrysene. Therefore, barium, benzo(a)pyrene, pyrene, and chrysene were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- The screening value for barium (4 μg/L) is very conservative and likely does not reflect the bioavailability of barium in the aquatic environment. Barium compounds have low toxicity to aquatic organisms, with the barium ion responsible for the toxic effects (Federal Register, 62[2]:366-372, 3 January 1997). In aquatic media, barium compounds are likely to precipitate out of solution as $BaSO_4$ or $BaCO_3$ when they react with the sulfate or carbonate present in most surface water. Therefore, the barium is rendered essentially non-toxic and does not represent a risk to aquatic organisms. Based upon this, barium was not identified as a refined COPC in surface water.
- The mean HQ for benzo(a)pyrene (7.93) and pyrene (4.83) exceeded one. The mean concentration of chrysene was higher than screening values for some other PAHs (such as benzo[a]pyrene and pyrene). Therefore, benzo(a)pyrene, pyrene, and chrysene were identified as refined COPCs.

Surface Sediment

Eleven metals (arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc), nine pesticides (4,4′-DDD, 4,4′-DDE, 4,4′-DDT, alpha-chlordane, dieldrin, endrin, endrin aldehyde, gamma-chlordane, and heptachlor epoxide), two PCBs (Aroclors 1254 and 1260), 15 individual PAH compounds, and total PAHs (including HMW and LMW PAHs) exceeded screening values based upon maximum detected concentrations (**Tables B-20** and **B-21**). Screening values were not available for beryllium, thallium, endosulfan I, endosulfan II, endosulfan sulfate, heptachlor, methoxychlor, pentachlorophenol, 2-butanone, acetone, carbon disulfide, ethylbenzene, methyl acetate, methylcyclohexane, tetrachloroethene, toluene, and total xylenes. Therefore, these 57 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- The mean HQs for chromium, iron, mercury, nickel, alpha-chlordane, acenaphthene, fluoranthene, and phenanthrene were less than one. Therefore, these eight chemicals were not identified as refined COPCs.
- Beryllium and thallium did not have available screening values. However, these metals are not known to be associated with any site activities. Thallium was detected in only two of 12 samples. The small range in beryllium concentrations (0.25 to 0.98 mg/kg) suggests that this chemical may be at background concentrations. Therefore, these two metals were not identified as refined COPCs.
- EqP sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for most of the organic initial COPCs (**Table B-20**). EqP sediment values were exceeded for two of the PAHs, seven of the pesticides, and Aroclor-1254 based upon maximum surface sediment concentrations but not based upon mean surface sediment concentrations. Therefore, when bioavailability is considered for these chemicals, none were identified as refined COPCs based upon mean surface sediment concentrations. However, total PAHs (including both the HMW and LMW groups) did exceed screening values based upon mean concentrations and were identified as refined COPCs (see below). Therefore, the individual PAHs, as members of these groups, were also identified as refined COPCs regardless of individual screening status. A number of pesticides (particularly 4,4′-DDD, 4,4′-DDE, 4,4′-DDT, dieldrin, endrin, endrin aldehyde, endosulfan I, endosulfan II, heptachlor epoxide, and methoxyclor) and Aroclor-1254 were elevated in one sample (CAS04-SD03-1209A) located at the upstream end of the pond. Based upon the magnitude of the exceedances in this sample, these 11 chemicals were identified as refined COPCs.
- Methyl acetate and methylcyclohexane, which did not have screening values, were each detected in only a single sample at concentrations (5.00 and 4.00 μg/kg, respectively) that were less than screening values for all other VOCs. Therefore, neither of these chemicals was identified as a refined COPC. Acetone, which also did not have a screening value, was detected at a maximum concentration (270 μg/kg) that was less than screening values for similar chemicals (such as 2-butanone). Therefore, acetone was not identified as a refined COPC.
- The mean HQ exceeded one for arsenic (1.06), barium (2.96), cadmium (1.89), copper (1.26), lead (2.47), silver (1.49), zinc (1.11), total PAHs (1.66), HMW PAHs (1.39), and LMW PAHs (2.40). These 10 chemicals were identified as refined COPCs.

Subsurface Sediment

Thirteen metals (aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, vanadium, and zinc), ten pesticides (4,4′-DDD, 4,4′-DDE, 4,4′-DDT, alpha-chlordane, dieldrin, endrin, endrin aldehyde, endrin ketone, gamma-chlordane, and heptachlor epoxide), two PCBs (Aroclors 1254 and 1260), 11 individual PAH compounds, total PAHs (including LMW PAHs but not HMW PAHs), and di-n-butylphthalate exceeded screening values based upon maximum detected concentrations (**Tables B-22** and **B-23**). Screening values were not available for beryllium, thallium, endosulfan I, endosulfan II, endosulfan sulfate, methoxychlor, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-butanone, 4-methyl-2-pentanone, acetone, methyl acetate, methylcyclohexane, and tetrachloroethene. Therefore, these 53 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- The mean HQs for aluminum, arsenic, chromium, copper, iron, mercury, nickel, silver, vanadium, zinc, alpha-chlordane, di-n-butylphthalate, nine of the PAHs, and total PAHs were less than one. Therefore, these 22 chemicals were not identified as refined COPCs. Dibenz(a,h)anthracene was also not identified as a refined COPC because total PAHs and HMW PAHs (to which group it belongs) were not refined COPCs. LMW PAHs were not identified as refined COPCs based upon the low magnitude of the mean HQ (1.35), the low frequency of exceedance (1 of 12 samples), and because the only LMW PAH that exceeded screening values based upon mean concentrations (fluorene) did not exceed EqP-based values.
- Beryllium and thallium did not have available screening values. However, these metals are not known to be associated with any site activities. Thallium was detected in only two of 12 samples. The small range in beryllium concentrations (0.21 to 1.00 mg/kg) suggests that this chemical may be at background concentrations. Therefore, these two metals were not identified as refined COPCs.
- EqP sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for most of the organic initial COPCs (**Table B-22**). EqP sediment values were exceeded for eight of the pesticides and Aroclor-1254 based upon maximum subsurface sediment concentrations but not based upon mean subsurface sediment concentrations. Therefore, when bioavailability is considered for these chemicals, none were identified as refined COPCs based upon mean subsurface sediment concentrations. However, a number of pesticides (particularly 4,4′-DDD, 4,4′-DDE, 4,4′-DDT, dieldrin, endosulfan I, endosulfan II, endrin, endrin aldehyde, endrin ketone, heptachlor epoxide, and methoxyclor) and Aroclor-1254 were elevated in one sample (CAS04-SD03-1209B) located at the upstream end of the pond. Based upon the magnitude of the exceedances in this sample, these 12 chemicals were identified as refined COPCs.
- Methyl acetate and methylcyclohexane, which did not have screening values, were each detected in only a single sample at concentrations (4.00 and 2.00 µg/kg, respectively) that were less than screening values for all other VOCs. Therefore, neither of these chemicals was identified as a refined COPC. Acetone, which also did not have a screening value, was detected at a maximum concentration (420 µg/kg) that was less than screening values for similar chemicals (such as 2-butanone). Therefore, acetone was not identified as a refined COPC.
- The mean HQ exceeded one for barium (1.85), cadmium (1.14), and lead (1.28). These three constituents were identified as refined COPCs.

Aquatic Food Web

HQs based upon maximum exposure doses for each upper trophic level aquatic receptor are listed in **Table B-24** (calculations are included in **Appendix B**). Based upon a comparison to NOAELs, arsenic, cadmium, chromium, copper, lead, mercury, selenium, zinc, Aroclor-

1254, Aroclor-1260, 4,4′-DDE, 4,4′-DDT, dieldrin, and endrin had HQs exceeding one for one or more receptors. Therefore, these 14 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more-realistic assumptions to select refined COPCs, as follows:

- HQs based upon 95 percent UCL exposure doses for each upper trophic level aquatic receptor are listed in **Table B-25** (calculations are included in **Appendix B**). Based upon a comparison to NOAELs, chromium, lead, mercury, zinc, Aroclor-1254, Aroclor-1260, 4,4′-DDE, 4,4′-DDT, and dieldrin had HQs exceeding one for at least one receptor. There were exceedances based upon the MATC for mercury, Aroclor-1254, and dieldrin, and based upon the LOAEL for Aroclor-1254.
- HQs based upon arithmetic mean exposure doses for each upper trophic level aquatic receptor are listed in **Table B-26** (calculations are included in **Appendix B**). Based upon a comparison to NOAELs, mercury, zinc, Aroclor-1254, and dieldrin had HQs exceeding one for at least one receptor. There were exceedances based upon the MATC and LOAEL for Aroclor-1254.
- Based upon the exceedance of the MATC and LOAEL for the mean exposure scenario, Aroclor-1254 was identified as a refined COPC for aquatic food web exposures.

5.3 AOC 3 Release Assessment Decision Analysis

This subsection discusses the sample results in the context of the Data Evaluation Diagram (**Figure 1-2**), and is also summarized in **Table 5-7**.

Step 1—Determination of Potential CERCLA Eligibility and if CERCLA-eligible, has a CERCLA-regulated release occurred at the site?

This site is an unlined, non-permitted disposal area whose date(s) of debris disposal are unknown. The site has a surface debris pile with approximate dimensions of 20 feet by 20 feet by 10 feet high located in the southwest corner of AOC 3. The surface debris pile contains metal banding, a few empty drums, and charred wood. Subsurface debris consists of tar paper, metal debris, a 55-gallong drum, concrete and other construction debris, automotive parts, and wood.

Because AOC 3 was listed as an SSA within the FFA as a site that "may pose a threat, or potential threat, to human health and the environment), and because VOCs, SVOCs, pesticides, PCBs, and inorganic constituents were observed above background levels during the SI, it is considered to be CERCLA-eligible. AOC 3 is further evaluated in the decision analysis process in Step 2a.

Step 2— Does the CERCLA release pose potential unacceptable risks to human health and the environment?

Step 2a—Comparison to Conservative Screening Values

In summary, two VOCs (chloroform and methylene chloride), 21 SVOCs (3- and 4-methylphenol, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, PAH (HMW), PAH (LMW), phenanthrene, and pyrene), 10 pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, delta-BHC, dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, and gamma-BHC [Lindane]), 1 PCB (Aroclor-1260), and 12 total inorganics (aluminum, arsenic, chromium, copper, iron, lead, mercury, nickel, selenium, silver, thallium, and zinc) exceeded one or more screening criteria in surface soil. Four VOCs (benzene, chloroform, ethylbenzene, and methylene chloride), 11 SVOCs (2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, hexachlorobenzene, indeno(1,2,3-cd)pyrene, and naphthalene), 9 pesticides (4,4'-DDD, 4,4'-DDE, aldrin, delta-BHC, dieldrin, endosulfan sulfate, endrin, gamma-BHC (Lindane), and gamma-Chlordane), and 10 total inorganics (aluminum, antimony, arsenic, chromium, cobalt, manganese, selenium, silver, vanadium, and zinc) exceeded one or more screening criteria in subsurface soil samples.

In groundwater, four VOCs (1,4-dichlorobenzene, benzene, ethylbenzene, and total xylenes), 9 SVOCs (2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, dibenzofuran , indeno(1,2,3-cd)pyrene, and naphthalene), one pesticide (dieldrin), seven total inorganics (aluminum, arsenic, chromium, iron, manganese, mercury, and vanadium) and four dissolved inorganics (arsenic, cobalt, iron, and manganese) exceeded at least one screening criterion.

In surface water, two SVOCs (benzo(a)pyrene and pyrene), seven total inorganics (aluminum, arsenic, barium, cadmium, copper, iron, and manganese), and one dissolved inorganic (barium) exceeded at least one screening criterion.

One VOC (carbon disulfide), 18 SVOCs (acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, flourene, indeno(1,2,3-cd)pyrene, naphthalene, PAH (HMW), PAH (LMW), PAH (total), phenanthrene, and pyrene), 12 pesticides (4,4'-DDD, 4-4'-DDE, 4-4'-DDT, alpha-Chlordane, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin, endrin aldehyde, gamma-chlordane, and heptachlor epoxide), two PCBs (Aroclor-1254 and Aroclor-1260), and 11 inorganics (arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc) exceeded screening criteria in surface sediment. Eleven SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene), 11 pesticides (4,4'-DDD, 4-4'-DDE, 4-4'-DDT, alpha-Chlordane, dieldrin, endosulfan I, endosulfan II, endrin, endrin aldehyde, gamma-Chlordane, and heptachlor epoxide), two PCBs (Aroclor-1254 and Aroclor-1260), and 12 inorganics (aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, nickel, silver, vanadium, and zinc) exceeded screening criteria in subsurface sediment.

Step 2b—Conduct a Semi-quantitative Risk Evaluation Using More-Realistic Assumptions

Human Health Risk Evaluation

Exposure to surface soil at AOC 3 may result in unacceptable human health risks associated with PAHs, dieldrin, gamma-BHC, arsenic, and chromium, based on potential human exposure. Exposure to subsurface soil at AOC 3 may result in unacceptable human health risks primarily associated with PAHs, arsenic, and chromium, based on potential human exposure.

Exposure to groundwater at AOC 3 may result in unacceptable human health risks associated with VOCs, PAHs, and metals based on potential human exposure. Exposure to indoor air at AOC 3 may result in unacceptable human health risks associated with benzene, ethylbenzene, and naphthalene, based on potential human exposure.

Exposure to surface water in Upstream Pond adjacent to Site 4 and AOC 3 may result in unacceptable human health risks associated with benzo(a)pyrene and arsenic, based on potential human exposure. The potential unacceptable carcinogenic risk is primarily associated with arsenic; arsenic was only detected in one of the eight surface water samples. Benzo(a)pyrene alone does not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$.

Exposure to surface sediment in Upstream Pond adjacent to Site 4 and AOC 3 may result in unacceptable human health risks associated with PAHs, pesticides/PCBs, and metals, based on potential human exposure. Exposure to subsurface sediment in Upstream Pond adjacent to Site 4 and AOC 3 may result in unacceptable human health risks associated with benzo(a)pyrene, Aroclor-1254, dieldrin, arsenic, and chromium, based on potential human exposure.

Ecological Risk Evaluation

At AOC 3, potential unacceptable ecological risks were identified with exposure to surface soil attributable to 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, dibenzofuran, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, PAH (HMW), PAH (LMW), phenanthrene, pyrene, dieldrin, endosulfan I, endrin, endrin aldehyde, and gamma-BHC (lindane). Potential unacceptable ecological risks were identified with exposure to subsurface soil attributable to endrin.

In Upstream Pond, potential unacceptable ecological risks were identified with exposure to surface water attributable to benzo(a)pyrene, chrysene, and pyrene. Potential unacceptable ecological risks were identified with exposure to surface sediment attributable to 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, PAH (HMW), PAH (LMW), PAH (total), phenanthrene, pyrene, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aroclor-1254, dieldrin, endosulfan I, endosulfan II, endrin, endrin aldehyde, heptachlor epoxide, methoxychlor, arsenic, barium, cadmium, copper, lead, silver, and zinc. Potential unacceptable risks were identified with exposure to subsurface sediment attributable to 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aroclor-1254, dieldrin, endosulfan I, endosulfan II, endrin, endrin aldehyde, endrin ketone, heptachlor epoxide, methoxychlor, barium, cadmium, and lead.

Step 3—Is Further Investigation or Action Required?

Results from test pitting activities indicate that buried debris exists at AOC 3; however, since the depth of buried debris was greater than the maximum excavation depth of the equipment used during test pitting (8 feet) or buried debris was encountered below the water table in several test pits, the vertical and horizontal extent of the debris was not fully characterized during test pitting activities. In addition, further site characterization of environmental media will also be needed.

While the potential source area and the nature of contamination at AOC 3 has been sufficiently characterized, an RI is recommended to further delineate the vertical and horizontal extent of buried debris near Upstream Pond and to characterize the extent of contamination within soil, groundwater, and sediment and to further quantify the risk associated with all media. Information regarding the number of samples, sampling locations, sampling analytes, and how the sample data will be used in the RI will be agreed to by the CAX Partnering Team and documented in an RI UFP-SAP, to be submitted under separate cover. Following the RI, an FS would be prepared to evaluate remedial alternatives to mitigate potential risk to human health and ecological receptors associated with debris and from media contamination. Table 5-7 summarizes the results of the decision analysis for AOC 3. In addition, due to the close proximity of Site 4 and AOC 3 to each other and Upstream Pond, it is recommended that Site 4 and AOC 3 be combined into one Site, Site 4.

TABLE 5-1
AOC 3 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS004-4HA06	CAA03-SS01	CAA03-SS02	CAA03-SS03	CAA03-SS04	CAA03-SS05	CAA03-SS06	CAA03-SS07	CAA03-SS08		CAA03-SS09	CAA03-SS10
Sample ID					CAS004-4HA06-00-1199	CAA03-SS01-1109	CAA03-SS02-1109	CAA03-SS03-1109	CAA03-SS04-1109	CAA03-SS05-1109	CAA03-SS06-1109	CAA03-SS07-1109	CAA03-SS08-1109	CAA03-SS08P-1109	CAA03-SS09-1109	CAA03-SS10-1109
Sample Date					11/12/99	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Depth					0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'
Chemical Name																
Volatile Organic Compounds (UG/KG)																
2-Butanone	--	--	2,800,000	1,500	12.1 UL	25 UJ	29 UJ	32 UJ	28 UJ	25 UJ	29 UJ	25 UJ	31 UJ	34 UJ	24 J	22 J
Acetone	--	--	6,100,000	4,500	12.1 UL	82 B	74 B	71 B	78 B	100 J	43 B	54 B	110 B	100 B	640 J	560 J
Chloroform	--	1,844	290	0.053	12.1 UL	6 UJ	7 UJ	8 UJ	7 UJ	0.6 J	7 UJ	6 UJ	7 UJ	8 UJ	0.9 J	0.6 J
Methylene chloride	--	1,250	11,000	1.2	12.1 UL	25 UJ	9 J	32 UJ	12 J	25 UJ	13 J	25 UJ	31 UJ	34 UJ	31 UJ	34 UJ
Styrene	--	64,000	630,000	1,800	12.1 UL	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	1 J	7 UJ	6 UJ	10 J
Toluene	--	40,000	500,000	1,600	12.1 UL	5 UJ	6 UJ	6 UJ	4 B	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	3 J
Semivolatile Organic Compounds (UG/KG)																
1,1-Biphenyl	--	13,600	210,000	19,000	NA	380 U	390 U	390 U	380 U	340 U	3,800	340 U	420 U	410 U	350 U	350 U
2,4-Dimethylphenol	--	1,000	120,000	860	3,900 U	580 U	600 U	590 U	580 U	520 U	420 J	520 U	640 U	630 U	530 U	530 U
2-Methylnaphthalene	--	LMW PAH	31,000	750	3,900 U	23 J	25	6.8 J	23 U	21 U	49,000 U	20 J	26 U	25 U	21 U	21 U
2-Methylphenol	--	1,000	310,000	1,500	3,900 U	700 U	720 U	700 U	690 U	620 U	440 J	630 U	770 U	750 U	640 U	630 U
3- and 4-Methylphenol	--	1,000	31,000	150	NA	660 U	680 U	670 U	660 U	590 U	1,200	590 U	730 U	720 U	610 U	600 U
Acenaphthene	--	LMW PAH	340,000	22,000	3,900 U	61	65	27	6.9 J	21 U	24,000 J	50	26 U	25 U	21 U	21 U
Acenaphthylene	--	LMW PAH	340,000	22,000	3,900 U	30	240	72	26	3.8 J	4,100 J	19 J	26 U	25 U	21 U	21 U
Anthracene	--	LMW PAH	1,700,000	360,000	1,700 J	140	260	200	37	3.8 J	140,000	150	26 U	2.7 J	21 U	21 U
Benzaldehyde	--	--	780,000	810	NA	420 UJ	430 U	420 U	420 U	370 U	440 U	380 U	460 U	200 J	380 U	380 U
Benzo(a)anthracene	--	HMW PAH	150	10	8,800	590	1,600	740	200	26	180,000	1,100	20 J	28	14 J	18 J
Benzo(a)pyrene	--	HMW PAH	15	3.5	7,000	480	1,200	440	160	20 J	130,000	950	16 J	22 J	11 J	14 J
Benzo(b)fluoranthene	--	HMW PAH	150	35	6,800	840	2,100	670	190 J	28 J	200,000	1,400	29	40	20 J	26
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	3,400 J	130 L	440 L	70 L	23 L	21 UL	66,000 L	320 J	3.8 B	2.6 B	21 R	2.6 B
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	6,800	190	650	140	71	9.2 J	81,000	560	26 U	25 U	21 U	21 U
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100	3,900 U	120 U	120 U	120 U	120 U	100 U	240,000 U	780 J	130 U	120 U	110 U	100 U
Butylbenzylphthalate	--	30,000	260,000	510	3,900 U	380 U	390 U	390 U	380 U	340 U	400 U	2,800	420 U	410 U	350 U	350 U
Carbazole	--	--	--	--	3,900 U	230 J	190	80	18 J	3.2 J	120,000 J	90 J	3 J	5.6 J	3.8 J	4 J
Chrysene	--	HMW PAH	15,000	1,100	8,600	730	1,300	580	170 J	17 J	210,000	1,400	18 J	26	12 J	16 J
Dibenz(a,h)anthracene	--	HMW PAH	15	11	1,400 J	110 J	200 K	83 K	37 K	21 U	22,000 K	160	4.3 J	4.6 J	21 U	3.6 J
Dibenzofuran	--	--	7,800	680	3,900 U	380 U	390 U	390 U	380 U	340 U	19,000	340 U	420 U	410 U	350 U	350 U
Di-n-octylphthalate	--	30,000	35,000	1,100	3,900 U	740 U	760 U	750 U	740 U	670 U	780 U	770	820 U	800 U	680 U	680 U
Fluoranthene	--	LMW PAH	230,000	160,000	14,000	1,700	3,000	1,600	350	44	500,000	2,400	40	57	31	40
Fluorene	--	LMW PAH	230,000	27,000	3,900 U	90	130	110	11 J	21 U	40,000 J	50	26 U	25 U	21 U	21 U
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	3,400 J	610 K	240 J	280 J	160 J	33 J	69,000 J	920 J	25 B	29	18 B	20 B
Naphthalene	--	LMW PAH	3,600	0.47	3,900 U	64	31	7.7 J	23 U	21 U	26,000 J	17 J	26 U	25 U	21 U	21 U
PAH (HMW)	--	18,000	--	--	57,200	5,080	10,130	4,003	1,281	197	1,348,000	9,610	151	217	124	135
PAH (LMW)	--	29,000	--	--	32,900	3,420	5,563	3,335	595	121	1,253,100	3,917	154	176	124	140
Phenanthrene	--	LMW PAH	1,700,000	360,000	5,500	1,300	1,800	1,300	130	17 J	470,000	1,200	23 J	41	19 J	26
Phenol	--	1,880	1,800,000	6,300	3,900 U	540 U	560 U	550 U	540 U	490 U	600	490 U	600 U	590 U	500 U	500 U
Pyrene	--	HMW PAH	170,000	120,000	11,000	1,400	2,400	1,000	270	26	390,000	2,800	36	54	26	36
Pesticide/Polychlorinated Biphenyls (UG/KG)																
4,4'-DDD	--	583	2,000	66	7.6 K	2.3 J	25 J	6 J	7.4 J	2.3 J	280 J	7.7 J	4 UJ	4.2 UJ	3.6 U	3.5 U
4,4'-DDE	--	114	1,400	47	3.9 U	0.96 B	83	3.5 J	7.3	1.2 J	52 J	3.2 U	4 UJ	0.8 J	3.6 U	1.7 J
4,4'-DDT	--	100	1,700	67	18 K	1 B	78	3.9 J	5.4 J	1.6 J	88 J	13 J	3.1 J	4.2 UJ	3.6 U	3.4 J
alpha-Chlordane	--	11.0	1,600	13	2 U	1.6 UJ	0.99 J	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Aroclor-1260	--	--	220	24	91 K	17 U	21 UL	20 U	21 U	20 UL	21 UJ	18 U	22 U	23 U	20 U	19 U
delta-BHC	--	226	270	0.22	2 U	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	140 J	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Dieldrin	--	10.5	30	0.17	3.9 U	3.2 UJ	3.9 U	3.7 U	1.4 J	3.8 UJ	650 J	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U
Endosulfan I	--	6.32	37,000	3,000	2 U	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	2,200 J	1.7 U	0.79 J	0.91 J	1.8 U	1.8 U
Endosulfan sulfate	--	6.32	37,000	3,000	3.9 U	1.9 J	8.9 J	3.7 U	3.9 U	3.8 UJ	78 U	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U
Endrin	--	1.95	1,800	440	3.9 U	3.2 UJ	3.9 U	16	10	3.8 UJ	130 J	3.2 U	6.8 J	16 J	55	3.9
Endrin aldehyde	--	1.95	1,800	440	3.9 U	3.2 UJ	3.9 U	3.8 J	2.6 J	3.8 UJ	78 U	3.2 U	3.5 J	5.4 J	3.6 U	2.2 J
gamma-BHC (Lindane)	--	7.75	520	0.36	2 U	5.2 J	9.6	0.82 J	2 U	1.9 UJ	860	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Explosives (UG/KG)																
No Detections	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)																
Aluminum	12,200	pH < 5.5	7,700	55,000	6,320 L	12,600	8,930	10,800	9,870	8,080	10,600	8,070	11,800	12,600	4,100	3,960
Antimony	11	78.0	3.1	0.66	0.44 UJ	0.13 L	0.19 L	0.25 L	0.17 L	0.07 L	0.21 L	0.07 J	0.15	0.15	0.08 J	0.07 J
Arsenic	6.36	18.0	0.39	0.0013	2.7 L	7.3	3	3.2	3.4	1.6	3.7	2.8	3.5	3.4	2.2	1
Barium	52.9	330	1,500	300	101 J	38.5	43.6 J	47.3 J	47.7 J	36 J	55.1 J	57	28.7	29.1	11.3	16.9
Beryllium	0.587	40.0	16	58	0.32 B	0.66	0.67	0.49	0.46 J	0.44 J	0.72	0.69	0.34 J	0.34 J	0.19 J	0.24 J

TABLE 5-1
AOC 3 Surface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS004-4HA06	CAA03-SS01	CAA03-SS02	CAA03-SS03	CAA03-SS04	CAA03-SS05	CAA03-SS06	CAA03-SS07	CAA03-SS08		CAA03-SS09	CAA03-SS10
Sample ID					CAS004-4HA06-00-1199	CAA03-SS01-1109	CAA03-SS02-1109	CAA03-SS03-1109	CAA03-SS04-1109	CAA03-SS05-1109	CAA03-SS06-1109	CAA03-SS07-1109	CAA03-SS08-1109	CAA03-SS08P-1109	CAA03-SS09-1109	CAA03-SS10-1109
Sample Date					11/12/99	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Depth					0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'	0-0.5'
Chemical Name																
Cadmium	1.5	32.0	7	1.4	0.34 U	0.95 U	**0.12 J**	**0.06 J**	**0.04 J**	**0.04 J**	**0.33 J**	**0.7 J**	1.1 U	1.2 U	0.92 U	0.02 B
Calcium	2,290	--	--	--	**2,940**	**16,900**	**5,960 J**	**2,850 J**	**2,870 J**	**612 J**	**18,800 J**	**7,950**	**2,920**	**2,630**	**730**	**318**
Chromium	18.2	64.0	0.29	8.30E-04	**56.6**	**24.9 K**	**15.2**	**13.1**	**16.7**	**9**	**17.8**	**22.8**	**18.4**	**18.8**	**8.4**	**5.8**
Total Metals (MG/KG)																
Cobalt	9.93	13.0	2.3	0.49	**8.8 J**	**2.9**	**3.4**	**2.7**	**2.5**	**2.5**	**4.4**	**4.9**	**1.8**	**1.9**	**0.72**	**0.84**
Copper	4.25	70.0	310	51	**77.8 J**	**5.3 K**	**9.4**	**4.9**	**5**	**3.8**	**31.8**	**17.7**	**4.8**	**4.2**	**1.9 J**	**1.9 J**
Cyanide	--	15.8	160	7.4	**0.07 L**	0.84 U	0.84 U	0.7 U	0.84 U	0.77 U	0.7 U	0.77 U	0.84 U	0.84 U	0.7 U	0.77 U
Iron	19,900	5 < pH > 8	5,500	640	**61,700 L**	**18,800**	**10,900 J**	**9,710 J**	**9,740 J**	**6,720 J**	**18,300 J**	**13,500**	**12,100**	**12,200**	**6,140**	**3,450**
Lead	17.4	120	400	--	**105 J**	**9.4 K**	**35.4**	**25.1**	**14.5**	**10.3**	**793**	**37**	**18.6**	**18.2**	**9.2**	**10.6**
Magnesium	1,070	--	--	--	**2,140**	**1,850 K**	**1,610 J**	**770 J**	**716 J**	**568 J**	**2,880 J**	**4,060**	**896**	**916**	**607**	**340**
Manganese	324	220	180	57	**302 J**	**85.1 K**	**155 J**	**121 J**	**106 J**	**98.9 J**	**253 J**	**315**	**39.9**	**35.8**	**19.1**	**27.9**
Mercury	0.111	0.10	2.3	0.57	**0.06 J**	**0.01 J**	**0.12**	**0.04**	**0.03 J**	**0.02 J**	**0.04 J**	0.035 U	**0.05**	**0.04**	**0.01 J**	**0.03 J**
Nickel	9.52	38.0	150	48	**39.6**	**5.5 J**	**9.8**	**5.3**	**5.2**	**3.7 J**	**9**	**8.8**	**4.5**	**4.7 J**	**1.8 J**	**1.9 J**
Potassium	708	--	--	--	**961 J**	**2,570 K**	**743 K**	**640 K**	**600 K**	**461 K**	**1,220 K**	**2,830**	**1,020**	**1,020**	**734**	**260**
Selenium	0.51	0.52	39	0.95	0.6 U	**0.36 J**	**0.44 J**	**0.45 J**	**0.51**	**0.33 J**	**0.84**	**0.16 J**	**0.42 J**	**0.47 J**	**0.21 J**	**0.24 J**
Silver	2.1	560	39	1.6	**20.6 L**	1.4 U	1.6 U	1.4 U	1.5 U	1.5 U	2.1 U	1.3 U	**0.25 J**	**0.27 J**	**0.29 J**	**0.1 J**
Sodium	521	--	--	--	73.1 B	**140 K**	**35 K**	**32.3 K**	**34.5 K**	**20.1 K**	**176 K**	**154**	**27.7 J**	**32.1 J**	**14.8 J**	**15.3 J**
Thallium	--	1.0	--	--	**1.1 L**	0.13 B	0.17 B	0.12 B	0.13 B	0.1 B	0.13 B	0.19 B	0.14 B	0.13 B	0.09 B	0.07 B
Vanadium	27.9	130	39	180	**35.7 J**	**27.2**	**19.5**	**20**	**17.8**	**14.6**	**26.9**	**24.3**	**29.1**	**29.5**	**11.4**	**8.6**
Zinc	26.5	120	2,300	680	**122 J**	**21.8 K**	**52.7**	**52.8**	**64.6**	**16.8**	**89.6**	**154**	**21.6**	**20.6**	**10**	**9.7**
Wet Chemistry																
pH (ph)	--	--	--	--	NA	**8.5**	**7.7**	**7.6**	**7**	**6.4**	**8.3**	**8.8**	**6.5**	**5.9**	**4.6**	**5**
Total organic carbon (TOC) (ug/g)	--	--	--	--	NA	**6,200**	**36,000**	**26,000**	**24,000**	**12,000**	**33,000**	**8,400**	**37,000**	**51,000**	**18,000**	**18,000**
Grain Size (PCT/P)																
GS07 Sieve 1" (25.0 mm)	--	--	--	--	NA	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	NA	**100**	**100**	**95**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	NA	**100**	**96**	**95**	**100**	**100**	**91**	**100**	**100**	**100**	**100**	**100**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	NA	**100**	**92**	**95**	**100**	**100**	**82**	**91**	**100**	**100**	**100**	**100**
Sieve No. 004 (4.75 mm)	--	--	--	--	NA	**99**	**75**	**93**	**100**	**100**	**73**	**77**	**100**	**100**	**100**	**100**
Sieve No. 010 (2.00 mm)	--	--	--	--	NA	**98**	**69**	**92**	**99**	**99**	**66**	**62**	**99**	**100**	**100**	**100**
Sieve No. 020 (850 um)	--	--	--	--	NA	**96**	**66**	**90**	**98**	**99**	**60**	**50**	**99**	**99**	**99**	**99**
Sieve No. 040 (425 um)	--	--	--	--	NA	**92**	**62**	**85**	**93**	**94**	**54**	**41**	**96**	**95**	**97**	**94**
Sieve No. 060 (250 um)	--	--	--	--	NA	**72**	**51**	**70**	**76**	**74**	**39**	**32**	**78**	**76**	**73**	**72**
Sieve No. 100 (150 um)	--	--	--	--	NA	**46**	**36**	**50**	**55**	**53**	**26**	**24**	**48**	**46**	**34**	**37**
Sieve No. 200 (75 um)	--	--	--	--	NA	**36**	**28**	**38**	**41**	**40**	**18**	**17**	**35**	**36**	**16**	**24**

Notes:

Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeds BKG, ECO, RSL & SSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 5-2
AOC 3 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS004-4HA06	CAA03-SB01	CAA03-SB02		CAA03-SB03		CAA03-SB04		CAA03-SB05		CAA03-SB06
Sample ID					CAS004-4-HA06-02-1199	CAA03-SB01-1109	CAA03-SB02-1109A	CAA03-SB02-1109B	CAA03-SB03-1109A	CAA03-SB03-1109B	CAA03-SB04-1109A	CAA03-SB04-1109B	CAA03-SB05-1109A	CAA03-SB05-1109B	CAA03-SB06-1109
Sample Date					11/12/99	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09
Depth					0.5-2'	0.5-2'	0.5-2'	15.5-16'	0.5-2'	15.5-16'	0.5-2'	14.5-15'	0.5-2'	15.1-15.6'	0.5-2'
Chemical Name															
Volatile Organic Compounds (UG/KG)															
2-Butanone	--	--	2,800,000	1,500	12.8 U	24 UJ	25 UJ	31 J	30 UJ	34 UJ	28 UJ	40 J	23 UJ	34 J	25 UJ
Acetone	--	--	6,100,000	4,500	12.8 U	69 B	29 B	290 J	68 B	73 B	60 B	310 J	65 B	210 J	45 B
Benzene	--	1,140	1,100	0.21	12.8 U	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	2 J	5 UJ
Carbon disulfide	--	--	82,000	310	12.8 U	5 UJ	5 UJ	4 J	6 UJ	7 UJ	6 UJ	3 J	5 UJ	1 J	5 UJ
Chloroform	--	1,844	290	0.053	12.8 U	6 UJ	6 UJ	12 UJ	7 UJ	8 UJ	7 UJ	12 UJ	1 J	9 UJ	6 UJ
Ethylbenzene	--	1,815	5,400	1.7	12.8 UL	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	2 J	5 UJ
Isopropylbenzene	--	--	210,000	1,100	NA	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	9 J	5 UJ
m- and p-Xylene	--	1,300	340,000	1,200	NA	10 UJ	11 UJ	22 UJ	13 UJ	15 UJ	12 UJ	3 J	10 UJ	19 J	11 UJ
Methylcyclohexane	--	--	--	--	NA	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	2 J	5 UJ	6 J	5 UJ
Methylene chloride	--	1,250	11,000	1.2	20 B	13 J	25 UJ	19 J	16 J	17 J	28 UJ	48 UJ	23 UJ	37 UJ	25 UJ
o-Xylene	--	1,300	380,000	1,200	NA	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	5 J	5 UJ
Styrene	--	64,000	630,000	1,800	12.8 UL	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ
Toluene	--	40,000	500,000	1,600	12.8 UL	5 UJ	5 UJ	3 J	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	4 J	2 J
Xylene, total	--	1,300	63,000	200	12.8 UL	14 UJ	15 UJ	30 UJ	18 UJ	20 UJ	16 UJ	3 J	14 UJ	24 J	15 UJ
Semivolatile Organic Compounds (UG/KG)															
1,1-Biphenyl	--	13,600	210,000	19,000	NA	350 U	370 U	540 U	360 U	380 U	360 U	690	360 U	460 U	370 U
2-Methylnaphthalene	--	LMW PAH	31,000	750	3,800 U	120 J	3.6 J	210	22 U	23 U	22 U	1,600	22 U	640	9.5 J
Acenaphthene	--	LMW PAH	340,000	22,000	3,800 U	290 J	8.5 J	58	22 U	12 J	5.9 J	660	22 U	140	38
Acenaphthylene	--	LMW PAH	340,000	22,000	3,800 U	21 U	100	140	22 U	8.8 J	23	390 J	22 U	66	18 J
Anthracene	--	LMW PAH	1,700,000	360,000	3,800 U	1,200	66	280	22 U	17 J	35	2,400	22 U	1,500	120
Benzo(a)anthracene	--	HMW PAH	150	10	500 J	1,900	350	840	11 J	34	180	2,700	8 J	320	440
Benzo(a)pyrene	--	HMW PAH	15	3.5	600 J	1,100	330	690	5.3 J	26	260	1,700	22 U	210	250
Benzo(b)fluoranthene	--	HMW PAH	150	35	490 J	1,700	470	900	22 U	44 J	360	2,200	8.9 J	250 J	480
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	440 J	220 L	130 L	140 L	22 UL	23 UL	66 L	490 L	22 UL	27 L	48 L
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	760 J	710	150	220	22 U	9.8 J	84	910	22 U	77	160
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100	3,800 U	110 U	110 U	660 J	110 U	110 U	110 U	290	110 U	320	41 J
Carbazole	--	--	--	--	3,800 U	650 J	39	940	22 U	18 J	17 J	2,400	22 U	1,900	180 J
Chrysene	--	HMW PAH	15,000	1,100	620 J	1,800	320	840	22 U	19 J	160 J	2,000	22 U	320 J	420
Dibenz(a,h)anthracene	--	HMW PAH	15	11	3,800 U	180 J	85 K	120 K	22 U	23 U	70 K	330 K	22 U	36 K	52 K
Dibenzofuran	--	--	7,800	680	3,800 U	350 J	370 U	280 J	360 U	380 U	360 U	2,000	360 U	350 J	370 U
Fluoranthene	--	LMW PAH	230,000	160,000	880 J	5,400	620	2,400	8.4 B	72	320	6,000	7.4 B	820	1,000
Fluorene	--	LMW PAH	230,000	27,000	3,800 U	660	33	390	22 U	29	12 J	2,000	22 U	450	58
Hexachlorobenzene	--	1,000	300	0.53	3,800 U	21 U	22 U	33 U	22 U	23 U	22 U	31 U	22 U	28 U	22 U
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	3,800 U	1,400 K	230 J	430 J	14 J	52 J	280 J	240 J	22 U	200 J	150 J
Naphthalene	--	LMW PAH	3,600	0.47	3,800 U	240	7.4 J	630	22 U	14 J	22 U	8,000	22 U	3,500 J	28
PAH (HMW)	--	18,000	--	--	7,880	13,010	2,545	NA	89.7	NA	1,720	NA	87	NA	2,810
PAH (LMW)	--	29,000	--	--	14,580	12,931	1,110	NA	82.5 U	NA	559	NA	82.4 U	NA	2,083
Phenanthrene	--	LMW PAH	1,700,000	360,000	400 J	5,000	260	2,600	2.5 B	48	130	8,000	3.4 B	1,400	800
Pyrene	--	HMW PAH	170,000	120,000	670 J	4,000	480	1,700	4.4 J	41	260	4,100	4.1 J	640	810
Pesticide/Polychlorinated Biphenyls (UG/KG)															
4,4'-DDD	--	583	2,000	66	3.8 U	2.8 J	9.2	3.3 J	5.1 J	1.2 J	13	170 J	2.6 J	4.8 UJ	2.4 J
4,4'-DDE	--	114	1,400	47	3.8 U	1.6 B	24	1.6 J	7.4 J	1.6 J	20	150 J	6	1.5 J	1.2 J
4,4'-DDT	--	100	1,700	67	8.4 J	3.6 UJ	23	5.3 UJ	3.5 UJ	11 J	3.8	5.1 UJ	1.8 J	4.8 UJ	3.5 UJ
Aldrin	--	3.63	29	0.65	1.9 U	1.9 UJ	1.8 U	1.2 J	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	2.4 UJ	1.8 UJ
alpha-Chlordane	--	11.0	1,600	13	1.9 U	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	4 J	1.8 U	2.4 UJ	1.8 UJ
delta-BHC	--	226	270	0.22	1.9 U	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	1.3 J	1.4 J
Dieldrin	--	10.5	30	0.17	3.8 U	3.6 UJ	1.9 J	5.3 UJ	2 J	3.9 UJ	3.2 J	30 J	1 J	4.8 UJ	3.5 UJ
Endosulfan sulfate	--	6.32	37,000	3,000	3.8 U	3.6 UJ	3.6 U	2.7 J	3.5 UJ	3.9 UJ	3.6 U	5.1 UJ	3.4 U	4.8 UJ	3.5 UJ
Endrin	--	1.95	1,800	440	3.8 U	3.6 UJ	3.6 U	5.3 UJ	13 J	76 J	3.6 U	5.1 UJ	3.4 U	4.8 UJ	3.5 UJ
Endrin aldehyde	--	1.95	1,800	440	3.8 U	3.6 UJ	3.6 U	5.3 UJ	3.5 UJ	3.9 UJ	3.6 U	2.9 J	3.4 U	4.8 UJ	3.5 UJ
Endrin ketone	--	1.95	1,800	440	3.8 U	3.6 UJ	3.6 U	5.3 UJ	3.5 UJ	3.9 UJ	3.6 U	5.1 UJ	3.4 U	4.8 UJ	3.5 UJ
gamma-BHC (Lindane)	--	7.75	520	0.36	1.9 U	6.4 J	1.5 J	6.4 J	1.8 UJ	0.72 J	0.57 J	1.6 J	1.8 U	1.2 J	4.1 J
gamma-Chlordane	--	11.0	1,600	13	1.9 U	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1 J	11 J	1.8 U	2.4 UJ	1.8 UJ
Explosives (UG/KG)															
No Detections	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)															
Aluminum	13,000	pH < 5.5	7,700	55,000	3,550 L	8,290	15,800	28,600	12,100	14,000	10,600	12,800	10,300	2,790	11,600
Antimony	--	78.0	3.1	0.66	1.1 B	0.1 L	0.11 L	0.11 L	0.11 L	1.2 L	0.09 L	0.26 L	0.05 L	0.08 L	0.08 L
Arsenic	5.54	18.0	0.39	0.0013	4.2 L	2.4	4	7.6	2.3	21	2.4	3.9	1.7	3.7	2.7
Barium	84.5	330	1,500	300	33.2 J	33	54.8 J	53.1 J	50.4 J	72.4 J	45.7 J	49.8 J	49.5 J	9 J	31.8 J
Beryllium	0.52	40.0	16	58	0.35 B	0.45 J	0.6	1.4	0.56	0.49 J	0.53	0.98	0.53	0.18 J	0.51

TABLE 5-2
AOC 3 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAS004-4HA06	CAA03-SB01	CAA03-SB02		CAA03-SB03		CAA03-SB04		CAA03-SB05		CAA03-SB06
Sample ID					CAS004-4-HA06-02-1199	CAA03-SB01-1109	CAA03-SB02-1109A	CAA03-SB02-1109B	CAA03-SB03-1109A	CAA03-SB03-1109B	CAA03-SB04-1109A	CAA03-SB04-1109B	CAA03-SB05-1109A	CAA03-SB05-1109B	CAA03-SB06-1109
Sample Date					11/12/99	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09
Depth					0.5-2'	0.5-2'	0.5-2'	15.5-16'	0.5-2'	15.5-16'	0.5-2'	14.5-15'	0.5-2'	15.1-15.6'	0.5-2'
Chemical Name															
Cadmium	--	32.0	7	1.4	0.15 U	1 U	0.86 U	**0.1 J**	1 U	**0.12 J**	0.85 U	**0.2 J**	0.89 U	**0.07 J**	**0.03 J**
Calcium	2,380	--	--	--	**2,460**	**7,510**	**1,620 J**	**3,780 J**	**1,790 J**	**2,900 J**	**1,700 J**	**4,970 J**	**943 J**	**1,990 J**	**13,200 J**
Chromium	33.7	64.0	0.29	8.30E-04	**29.2**	**12 K**	**18.1**	**49.6**	**14.6**	**33.3**	**13.7**	**23.8**	**11.5**	**6.8**	**16**
Cobalt	5.18	13.0	2.3	0.49	**3.6 J**	**2.7**	**3.4**	**9.8**	**2.8**	**3.5**	**3**	**4.1**	**2.7**	**0.68**	**2.6**
Copper	3.17	70.0	310	51	**19.4**	**4.9 K**	**3.6**	**14.8**	**3.6**	**9**	**2.9**	**5.7**	**3**	2.2 B	**3.3**
Iron	32,000	5 < pH > 8	5,500	640	**28,000 L**	**8,040**	**16,000 J**	**30,300 J**	**10,000 J**	**22,700 J**	**11,100 J**	**12,300 J**	**7,800 J**	**2,850 J**	**9,950 J**
Lead	8.79	120	400	--	**29.7**	**10 K**	**12.9**	**16.7**	**14.9**	**23.4**	**10.8**	**8.2**	**9**	**3.5**	**9.6**
Magnesium	1,120	--	--	--	**1,730**	**823 K**	**907 J**	**7,120 J**	**864 J**	**3,600 J**	**785 J**	**1,680 J**	**707 J**	**351 J**	**1,120 J**
Manganese	176	220	180	57	**114**	**64.1 K**	**161 J**	**410 J**	**86.4 J**	**79.4 J**	**92.8 J**	**30 J**	**122 J**	**13.1 J**	**46.8 J**
Mercury	0.14	0.10	2.3	0.57	**0.05 J**	0.036 U	**0.06**	**0.05 J**	**0.02 J**	**0.06**	**0.03 J**	**0.04 J**	**0.01 J**	0.045 U	**0.01 J**
Nickel	17.6	38.0	150	48	**20.4**	**4.1 J**	**5.3**	**22.4**	**5**	**32.4**	**4.5**	**8.2**	**4.4**	**1.4 J**	**5.3**
Potassium	901	--	--	--	920 B	**826 K**	**734 K**	**4,770 K**	**702 K**	**695 K**	**605 K**	**2,010 K**	**593 K**	**343 K**	**1,110 K**
Selenium	0.64	0.52	39	0.95	0.66 U	**0.35 J**	**0.51**	**0.71**	**0.32 J**	**0.36 J**	**0.34 J**	**0.65**	**0.29 J**	**0.13 J**	**0.31 J**
Silver	1.1	560	39	1.6	**8.5 L**	1.6 U	1.3 U	2.1 U	1.6 U	1.7 U	1.3 U	1.6 U	1.3 U	1.5 U	1.4 U
Sodium	811	--	--	--	31 B	**66.8 K**	**37.2 K**	**690 K**	**43.3 K**	**77.2 K**	**39.6 K**	**60.2 K**	**27.9 K**	**20.8 K**	**101 K**
Vanadium	48.3	130	39	180	**20.8**	**14.8**	**29.2**	**55.2**	**20.2**	**30.4**	**20.1**	**31.6**	**16.8**	**7.1**	**20.9**
Zinc	28	120	2,300	680	**236**	**16.4 K**	**20.2**	**86.8**	**21.1**	**158**	**18.1**	**26.6**	**15.1**	**6.9**	**15.5**
Wet Chemistry															
pH (ph)	--	--	--	--	NA	**8.1**	**7.6**	**7.9**	**8.2**	**7.7**	**8.3**	**7.6**	**7.3**	**7.4**	**8.4**
Total organic carbon (TOC) (ug/g)	--	--	--	--	NA	**3,900**	**8,400**	**17,000**	**5,400**	**11,000**	**18,000**	**32,000**	**5,300**	**24,000**	**3,600**
Grain Size (PCT/P)															
GS07 Sieve 1" (25.0 mm)	--	--	--	--	NA	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	NA	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	NA	**100**	**100**	**100**	**100**	**93**	**100**	**100**	**100**	**100**	**100**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	NA	**100**	**98**	**100**	**100**	**82**	**99**	**100**	**100**	**100**	**100**
Sieve No. 004 (4.75 mm)	--	--	--	--	NA	**99**	**95**	**100**	**100**	**78**	**98**	**99**	**99**	**99**	**99**
Sieve No. 010 (2.00 mm)	--	--	--	--	NA	**98**	**93**	**100**	**99**	**75**	**97**	**98**	**99**	**99**	**97**
Sieve No. 020 (850 um)	--	--	--	--	NA	**97**	**91**	**100**	**98**	**73**	**96**	**96**	**99**	**98**	**95**
Sieve No. 040 (425 um)	--	--	--	--	NA	**92**	**87**	**99**	**94**	**67**	**90**	**94**	**94**	**96**	**91**
Sieve No. 060 (250 um)	--	--	--	--	NA	**70**	**73**	**99**	**77**	**55**	**73**	**84**	**79**	**76**	**66**
Sieve No. 100 (150 um)	--	--	--	--	NA	**47**	**51**	**98**	**56**	**39**	**54**	**46**	**55**	**30**	**44**
Sieve No. 200 (75 um)	--	--	--	--	NA	**35**	**39**	**94**	**43**	**30**	**41**	**25**	**42**	**12**	**34**

Notes:
Exceeds Background
Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeds BKG, ECO, RSL & SSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 5-2
AOC 3 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk Based SSLs	CAA03-SB07	CAA03-SB08		CAA03-SB09	CAA03-SB10
Sample ID					CAA03-SB07-1109	CAA03-SB08-1109	CAA03-SB08P-1109	CAA03-SB09-1109	CAA03-SB10-1109
Sample Date					11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Depth					0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'
Chemical Name									
Volatile Organic Compounds (UG/KG)									
2-Butanone	--	--	2,800,000	1,500	25 UJ	30 UJ	30 UJ	29 UJ	27 UJ
Acetone	--	--	6,100,000	4,500	52 B	**220 J**	**240 J**	74 B	100 B
Benzene	--	1,140	1,100	0.21	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Carbon disulfide	--	--	82,000	310	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Chloroform	--	1,844	290	0.053	6 UJ	**0.8 J**	7 UJ	7 UJ	6 UJ
Ethylbenzene	--	1,815	5,400	1.7	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Isopropylbenzene	--	--	210,000	1,100	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
m- and p-Xylene	--	1,300	340,000	1,200	11 UJ	13 UJ	13 UJ	13 UJ	12 UJ
Methylcyclohexane	--	--	--	--	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Methylene chloride	--	1,250	11,000	1.2	25 UJ	30 UJ	30 UJ	29 UJ	**12 J**
o-Xylene	--	1,300	380,000	1,200	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Styrene	--	64,000	630,000	1,800	5 UJ	**2 J**	6 UJ	6 UJ	5 UJ
Toluene	--	40,000	500,000	1,600	5 UJ	6 UJ	**5 J**	6 UJ	5 UJ
Xylene, total	--	1,300	63,000	200	15 UJ	18 UJ	18 UJ	17 UJ	16 UJ
Semivolatile Organic Compounds (UG/KG)									
1,1-Biphenyl	--	13,600	210,000	19,000	360 U	380 U	360 U	360 U	290 U
2-Methylnaphthalene	--	LMW PAH	31,000	750	**32 J**	23 U	22 U	22 U	18 U
Acenaphthene	--	LMW PAH	340,000	22,000	**160**	23 U	22 U	22 U	18 U
Acenaphthylene	--	LMW PAH	340,000	22,000	**50 J**	23 U	22 U	22 U	18 U
Anthracene	--	LMW PAH	1,700,000	360,000	**560**	23 U	22 U	22 U	18 U
Benzo(a)anthracene	--	HMW PAH	150	10	**1,800**	23 U	**11 J**	22 U	18 U
Benzo(a)pyrene	--	HMW PAH	15	3.5	**1,400**	23 U	**12 J**	22 U	18 U
Benzo(b)fluoranthene	--	HMW PAH	150	35	**2,300**	23 U	**19 J**	22 U	18 U
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000	**560 J**	23 R	3 B	22 R	18 R
Benzo(k)fluoranthene	--	HMW PAH	1,500	350	**600**	23 U	22 U	22 U	18 U
bis(2-Ethylhexyl)phthalate	--	30,000	35,000	1,100	**160**	120 U	110 U	110 U	89 U
Carbazole	--	--	--	--	**210 J**	23 U	22 U	22 U	18 U
Chrysene	--	HMW PAH	15,000	1,100	**1,800**	23 U	**18 J**	22 U	18 U
Dibenz(a,h)anthracene	--	HMW PAH	15	11	**250**	23 U	**4.2 J**	22 U	18 U
Dibenzofuran	--	--	7,800	680	**120 J**	380 U	360 U	360 U	290 U
Fluoranthene	--	LMW PAH	230,000	160,000	**4,400**	**4.5 J**	22 U	22 U	18 U
Fluorene	--	LMW PAH	230,000	27,000	**220**	23 U	22 U	22 U	18 U
Hexachlorobenzene	--	1,000	300	0.53	22 U	23 U	**7.2 J**	22 U	18 U
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120	**1,300 J**	5.6 B	21 B	22 U	18 U
Naphthalene	--	LMW PAH	3,600	0.47	**29**	23 U	22 U	22 U	18 U
PAH (HMW)	--	18,000	--	--	**13,910**	94.8 U	**98.2**	99 U	81 U
PAH (LMW)	--	29,000	--	--	**8,362**	**96.5**	99 U	99 U	81 U
Phenanthrene	--	LMW PAH	1,700,000	360,000	**2,900**	23 U	22 U	22 U	18 U
Pyrene	--	HMW PAH	170,000	120,000	**3,900**	23 U	22 U	22 U	18 U
Pesticide/Polychlorinated Biphenyls (UG/KG)									
4,4'-DDD	--	583	2,000	66	**20 J**	3.8 UJ	**1.1 J**	3.6 UJ	3.5 U
4,4'-DDE	--	114	1,400	47	**19**	3.8 UJ	3.8 U	3.6 UJ	3.5 U
4,4'-DDT	--	100	1,700	67	**32**	**12 J**	3.8 U	3.6 UJ	3.5 U
Aldrin	--	3.63	29	0.65	1.9 U	**1.1 J**	2 U	1.9 UJ	1.8 U
alpha-Chlordane	--	11.0	1,600	13	**0.89 J**	2 UJ	2 U	1.9 UJ	1.8 U
delta-BHC	--	226	270	0.22	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
Dieldrin	--	10.5	30	0.17	3.6 U	**1.3 J**	3.8 U	**0.65 J**	3.5 U
Endosulfan sulfate	--	6.32	37,000	3,000	**9.2 J**	3.8 UJ	3.8 U	3.6 UJ	3.5 U
Endrin	--	1.95	1,800	440	3.6 U	**96 J**	**5.5 J**	**8.6 J**	3.5 U
Endrin aldehyde	--	1.95	1,800	440	3.6 U	3.8 UJ	3.8 U	3.6 UJ	3.5 U
Endrin ketone	--	1.95	1,800	440	3.6 U	**0.88 J**	3.8 U	3.6 UJ	3.5 U
gamma-BHC (Lindane)	--	7.75	520	0.36	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
gamma-Chlordane	--	11.0	1,600	13	**23 J**	2 UJ	2 U	1.9 UJ	1.8 U
Explosives (UG/KG)									
No Detections	--	--	--	--	NA	NA	NA	NA	NA
Total Metals (MG/KG)									
Aluminum	13,000	pH < 5.5	7,700	55,000	**10,800**	**23,100**	**24,500**	**22,600**	**4,310**
Antimony	--	78.0	3.1	0.66	**0.08**	**0.14**	**0.12**	**0.22**	**0.04 J**
Arsenic	5.54	18.0	0.39	0.0013	**2.4**	**5.7**	**5.7**	**12.7**	**0.71**
Barium	84.5	330	1,500	300	**32.3**	**28.1**	**30.8**	**31.2**	**17**
Beryllium	0.52	40.0	16	58	**0.95**	**0.52 J**	**0.55**	**0.89**	**0.31 J**

TABLE 5-2
AOC 3 Subsurface Soil Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs	CAA03-SB07	CAA03-SB08		CAA03-SB09	CAA03-SB10
Sample ID					CAA03-SB07-1109	CAA03-SB08-1109	CAA03-SB08P-1109	CAA03-SB09-1109	CAA03-SB10-1109
Sample Date					11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Depth					0.5-2'	0.5-2'	0.5-2'	0.5-2'	0.5-2'
Chemical Name									
Cadmium	--	32.0	7	1.4	**0.06 J**	1.1 U	0.98 U	**0.03 J**	0.65 U
Calcium	2,380	--	--	--	**10,400**	**862**	**714**	**350**	**107**
Chromium	33.7	64.0	0.29	8.30E-04	**17.6**	**33.6**	**35.6**	**46.2**	**6**
Cobalt	5.18	13.0	2.3	0.49	**3.5**	**3**	**3.1**	**3.9**	**1**
Copper	3.17	70.0	310	51	**9.4**	**3.4**	**3.8**	**4**	**1.4 J**
Iron	32,000	5 < pH > 8	5,500	640	**12,300**	**22,400**	**22,900**	**31,800**	**3,390**
Lead	8.79	120	400	--	**20**	**11.3**	**10.8**	**9.8**	**3.8**
Magnesium	1,120	--	--	--	**2,780**	**1,530**	**1,580**	**2,710**	**355**
Manganese	176	220	180	57	**259**	**27.3**	**26.8**	**30.5**	**20.7**
Mercury	0.14	0.10	2.3	0.57	**0.02 J**	**0.02 J**	**0.02 J**	**0.01 J**	**0.01 J**
Nickel	17.6	38.0	150	48	**7.4**	**6.5**	**6.8**	**8.9**	**2.1 J**
Potassium	901	--	--	--	**996**	**1,690**	**1,740**	**3,660**	**235**
Selenium	0.64	0.52	39	0.95	**0.43**	**0.4 J**	**0.47 J**	**0.41 J**	**0.23 J**
Silver	1.1	560	39	1.6	1.2 U	**0.44 J**	**0.21 J**	**0.82 J**	0.98 U
Sodium	811	--	--	--	**70.8 J**	**38.9 J**	**39.9 J**	**42.3 J**	**12.8 J**
Vanadium	48.3	130	39	180	**23.8**	**51.1**	**52.2**	**57**	**6.5**
Zinc	28	120	2,300	680	**39.6**	**20.9**	**21.3**	**28.1**	**8.1**
Wet Chemistry									
pH (ph)	--	--	--	--	**7.2**	**5.2**	**5.2**	**4.6**	**5**
Total organic carbon (TOC) (ug/g)	--	--	--	--	**14,000**	**11,000**	**9,200**	**5,700**	**6,700**
Grain Size (PCT/P)									
GS07 Sieve 1" (25.0 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**
GS08 Sieve 0.75" (19.0 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**
GS09 Sieve 0.5" (12.5 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**
GS10 Sieve 0.375" (9.5 mm)	--	--	--	--	**100**	**100**	**100**	**100**	**100**
Sieve No. 004 (4.75 mm)	--	--	--	--	**98**	**100**	**100**	**100**	**100**
Sieve No. 010 (2.00 mm)	--	--	--	--	**93**	**100**	**100**	**100**	**100**
Sieve No. 020 (850 um)	--	--	--	--	**89**	**99**	**99**	**100**	**99**
Sieve No. 040 (425 um)	--	--	--	--	**84**	**98**	**97**	**99**	**95**
Sieve No. 060 (250 um)	--	--	--	--	**67**	**81**	**78**	**84**	**72**
Sieve No. 100 (150 um)	--	--	--	--	**47**	**52**	**49**	**57**	**36**
Sieve No. 200 (75 um)	--	--	--	--	**38**	**39**	**38**	**45**	**22**

Notes:
- **Exceeds Background**
- **Exceeds BKG & ECO**
- **Exceeds BKG & SSL**
- **Exceeds BKG & RSL**
- **Exceeds BKG, ECO & SSL**
- **Exceeds BKG, RSL & SSL**
- **Exceeds BKG, ECO & RSL**
- **Exceeds BKG, ECO, RSL & SSL**

Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

TABLE 5-3
AOC 3 Groundwater Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID / Sample ID / Sample Date	CLEAN CAX BKG GW YE AQUIFER	CLEAN MCL-Groundwater	CLEAN RSLs Tapwater Adjusted	CAA03-GW01	CAA03-GW02	CAA03-GW03	CAA03-GW04	CAA03-GW05
Sample ID				CAA03-GW01-1109	CAA03-GW02-1109	CAA03-GW03-1109	CAA03-GW04-1109	CAA03-GW05-1109
Sample Date				11/02/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,2-Dichlorobenzene	--	600	37	1 U	1 U	0.2 J	1 U	1 U
1,4-Dichlorobenzene	--	75	0.43	1 U	1 U	2 J	1 U	1 U
Benzene	--	5	0.41	1 U	1 U	1 UJ	1 U	14
Cyclohexane	--	--	1,300	1 U	1 U	1 UJ	1 U	12
Ethylbenzene	--	700	1.5	1 U	1 U	1 UJ	0.2 J	10
Isopropylbenzene	--	--	68	1 U	1 U	1 UJ	1 U	4
m- and p-Xylene	--	--	120	2 U	2 U	2 UJ	1 J	20
Methylcyclohexane	--	--	--	1 U	1 U	1 UJ	1 U	11
Methyl-tert-butyl ether (MTBE)	--	--	12	3	2 U	2 UJ	2 U	2 U
o-Xylene	--	--	120	1 U	1 U	1 UJ	0.4 J	5
Styrene	--	100	160	1 U	1 U	1 UJ	1 U	0.5 J
Toluene	--	1,000	230	1 U	1 U	1 UJ	1 U	2
Xylene, total	--	10,000	20	3 U	3 U	3 UJ	2 J	25
Semivolatile Organic Compounds (UG/L)								
1,1-Biphenyl	--	--	180	10 U	9 U	12 U	9 U	8 J
2,4-Dimethylphenol	--	--	73	14 U	13 U	17 U	13 U	29
2-Methylnaphthalene	--	--	15	0.2 U	1.5	0.3 U	3.3	32
3- and 4-Methylphenol	--	--	18	17 U	16 U	20 U	16 U	12 J
Acenaphthene	--	--	220	0.2 U	0.54	0.24 U	1.4	8.9 J
Acenaphthylene	--	--	220	0.2 U	0.3	0.24 U	0.26 J	4.8
Anthracene	--	--	1,100	0.2 U	0.26	0.24 U	1	6.7
Benzaldehyde	--	--	370	10 UJ	9 UJ	12 UJ	9 U	2 J
Benzo(a)anthracene	--	--	0.029	0.2 U	0.29	0.24 U	1.3	2.9
Benzo(a)pyrene	--	0.2	0.0029	0.2 U	0.17 J	0.1 J	1.7	2
Benzo(b)fluoranthene	--	--	0.029	0.2 U	0.15 J	0.36 U	2.2	2.7
Benzo(g,h,i)perylene	--	--	110	0.2 U	0.083 J	0.24 U	0.49 J	1.2
Benzo(k)fluoranthene	--	--	0.29	0.2 U	0.19 U	0.24 U	0.92	0.94
Carbazole	--	--	--	0.2 U	4.3	0.71 U	8.6 J	0.7 U
Chrysene	--	--	2.9	0.2 U	0.19 U	0.24 U	0.58 B	2.1
Dibenz(a,h)anthracene	--	--	0.0029	0.2 U	0.24 U	0.3 U	0.21 J	0.26 J
Dibenzofuran	--	--	3.7	10 U	9 U	12 U	3 J	19
Fluoranthene	--	--	150	0.2 U	0.52	0.3 U	1.8	8.6 J
Fluorene	--	--	150	0.2 U	0.98	0.24 U	3.2	21 J
Indeno(1,2,3-cd)pyrene	--	--	0.029	0.2 U	0.24 B	0.29 B	0.89 B	1.2 J
Naphthalene	--	--	0.14	0.2 U	11	0.24 U	13	560
Phenanthrene	--	--	1,100	0.2 U	1.6	0.24 U	3.1	36
Phenol	--	--	1,100	10 U	9 U	12 U	9 U	5 J
Pyrene	--	--	110	0.2 U	0.42	0.24 U	1.5	6.3
Pesticide/Polychlorinated Biphenyls (UG/L)								
4,4'-DDE	--	--	0.2	0.1 U	0.11 UJ	0.11 U	0.013 J	0.12 U
Dieldrin	--	--	0.0042	0.1 U	0.11 UJ	0.11 U	0.017 J	0.12 U
Total Metals (UG/L)								
Aluminum	2,230	--	3,700	2,240	13,300	23,300	357	1,450
Antimony	18.8	6	1.5	0.54 J	0.67 J	0.58 J	0.35 J	0.54 J
Arsenic	2.28	10	0.045	5.5	8	53.8	16.8	4.8 J
Barium	118	2,000	730	26	114	107	139	302
Beryllium	2.45	4	7.3	0.17 J	0.71 J	1.4	1 U	0.11 J
Cadmium	0.605	5	1.8	0.31 J	0.26 J	0.23 J	1 U	0.09 J
Calcium	169,000	--	--	149,000	97,300	86,600	140,000	114,000
Chromium	15.1	100	0.043	10.5 J	23.9	44.5	2.8 J	5 J
Cobalt	20.6	--	1.1	2.2 J	4.1 J	5.1 J	30 U	0.91 J
Copper	12.2	1,300	150	13.8 J	10.7 J	10.7 J	25 U	2 J
Iron	894	--	2,600	4,660	28,800	31,900	19,900	39,400
Lead	21.3	15	15	2.5 J	18.6	15.1	1.6 J	5 J

TABLE 5-3
AOC 3 Groundwater Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**CLEAN CAX BKG GW YE AQUIFER**	**CLEAN MCL-Groundwater**	**CLEAN RSLs Tapwater Adjusted**	CAA03-GW01	CAA03-GW02	CAA03-GW03	CAA03-GW04	CAA03-GW05
Sample ID				CAA03-GW01-1109	CAA03-GW02-1109	CAA03-GW03-1109	CAA03-GW04-1109	CAA03-GW05-1109
Sample Date				11/02/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name								
Magnesium	11,500	--	--	**3,570**	**19,600**	**5,270**	**6,580**	**10,200**
Manganese	57.9	--	88	**50.7**	**642**	**290**	**210**	**380**
Total Metals (UG/L)								
Mercury	0.081	2	1.1	0.2 U	**0.73**	**0.03 J**	0.2 U	**2.3**
Nickel	11.4	--	73	**8 J**	**11.1 J**	**12.8 J**	**1.9 J**	**3.8 J**
Potassium	12,700	--	--	**2,010**	**17,100**	**4,640**	**2,290**	**6,990**
Silver	--	--	18	15 U	**0.85 J**	**0.84 J**	15 U	**2.2 J**
Sodium	64,500	--	--	**14,400**	**35,800**	**7,070**	**9,790**	**19,800**
Vanadium	26.2	--	18	**11.8 J**	**24.8 J**	**55.2**	25 U	25 U
Zinc	4.52	--	1,100	**13.2 J**	**55.7**	**39.1**	**10.5 J**	**50.4**
Dissolved Metals (UG/L)								
Antimony, Dissolved	9.7	6	1.5	**0.15 J**	**0.17 J**	**0.16 J**	**0.23 J**	**0.19 J**
Arsenic, Dissolved	1.37	10	0.045	5 U	**3.4 J**	**45.4**	**11.9**	**2.5 J**
Barium, Dissolved	127	2,000	730	**19.5**	**56.5**	**32.4**	**112**	**258**
Cadmium, Dissolved	0.177	5	1.8	**0.06 J**	1 U	**0.07 J**	1 U	**0.07 J**
Calcium, Dissolved	113,000	--	--	**139,000**	**92,800**	**89,500**	**135,000**	**111,000**
Chromium, Dissolved	6.04	100	0.043	**0.99 J**	**0.5 J**	**0.53 J**	**1.3 J**	**0.65 J**
Cobalt, Dissolved	0.7	--	1.1	**1.1 J**	30 U	30 U	30 U	**0.45 J**
Iron, Dissolved	275	--	2,600	**95.5 J**	**15,400**	**6,780**	**14,500**	**28,600**
Lead, Dissolved	1.7	15	15	5 U	5 U	**1.5 J**	5 U	5 U
Magnesium, Dissolved	11,200	--	--	**3,020**	**16,500**	**2,860**	**5,420**	**9,500**
Manganese, Dissolved	49.5	--	88	**36.8**	**520**	**258**	**163**	**377**
Nickel, Dissolved	12.2	--	73	**4.6 J**	0.69 B	1.2 B	1.2 B	**1.8 J**
Potassium, Dissolved	12,600	--	--	**1,360**	**15,000**	**1,800**	**1,970**	**6,550**
Silver, Dissolved	--	--	18	15 U	**0.84 J**	15 U	15 U	**0.97 J**
Sodium, Dissolved	62,800	--	--	**14,300**	**35,500**	**7,340**	**9,150**	**19,500**

Notes:

Exceeds Background
Exceeds BKG & MCL
Exceeds BKG & RSL
Exceeds BKG, MCL & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
UG/L - Micrograms per liter

TABLE 5-4
AOC 3 Surface Water Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID			CAS04-SW01	CAS04-SW02	CAS04-SW03	CAS04-SW04	CAA03-SW01		CAA03-SW02	CAA03-SW03	CAA03-SW04
Sample ID		CLEAN RSLs Tapwater X 10	CAS04-SW01-1209	CAS04-SW02-1209	CAS04-SW03-1209	CAS04-SW04-1209	CAA03-SW01-1209	CAA03-SW01P-1209	CAA03-SW02-1209	CAA03-SW03-1209	CAA03-SW04-1209
Sample Date	ECO Risk		12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09
Chemical Name											
Volatile Organic Compounds (UG/L)											
No Detections			NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/L)											
Acenaphthene	23.0	2,200	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.069 J**	0.2 U	0.19 U
Benzo(a)pyrene	0.014	0.029	0.19 U	0.19 U	**0.073 J**	**0.24 J**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Benzo(g,h,i)perylene	7.64	1,100	0.19 U	0.19 U	0.19 U	**0.16 J**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Benzo(k)fluoranthene	9.07	2.9	0.19 U	0.19 U	0.19 U	**0.15 J**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
bis(2-Ethylhexyl)phthalate	32.0	48	**0.86 J**	**0.85 L**	**1.3**	**0.75 J**	0.94 U	0.94 U	0.94 U	**1.1**	0.94 U
Chrysene	--	29	0.19 U	0.19 U	0.19 U	**0.08 J**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Fluoranthene	8.10	1,500	0.19 U	0.19 U	**0.13 J**	**0.32**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Indeno(1,2,3-cd)pyrene	4.31	0.29	0.19 U	0.19 U	0.19 U	**0.24**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Naphthalene	12.0	1.4	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.066 J**	0.2 U	0.19 U
Phenanthrene	6.30	11,000	0.19 U	0.19 U	**0.068 J**	**0.074 J**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Pyrene	0.025	1,100	0.19 U	0.19 U	**0.1 J**	**0.29**	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Pesticide/Polychlorinated Biphenyls (UG/L)											
No Detections			NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (UG/L)											
Aluminum	87.0	37,000	**178 J**	108 B	**2,730**	**445**	300 U	44.3 B	26.7 B	**212 J**	**306**
Arsenic	150	0.45	3.5 B	1.7 B	**10.3**	3.8 B	2.9 B	3.3 B	3.3 B	5.7 B	4.4 B
Barium	4.00	7,300	**24.4**	**24.2**	**44.4**	**25.2**	**23.1**	**23.8**	**26.8**	**28.4**	**23**
Beryllium	0.66	73	1 U	1 U	**0.12 J**	1 U	1 U	1 U	1 U	1 U	**0.06 J**
Cadmium	0.52	18	**0.13 J**	**0.16 J**	**0.82 J**	**0.22 J**	**0.06 J**	**0.11 J**	1 U	**0.15 J**	**0.23 J**
Calcium	--	--	**63,500**	**80,300**	**106,000**	**69,400**	**75,300**	**80,400**	**68,200**	**64,800**	**64,900**
Cobalt	23.0	11	**0.34 J**	**0.45 J**	**1.5**	**0.45 J**	**0.3 J**	**0.34 J**	**0.28 J**	**0.44 J**	**0.5 J**
Copper	20.0	1,500	**7.8**	**3.9**	**25.9**	**7.6**	**3**	**3**	**3**	**6.4**	**6.1**
Iron	1,000	26,000	**1,310**	**1,480**	**19,000**	**2,200**	**1,070**	**1,010**	**1,970**	**2,410**	**1,550**
Lead	9.90	150	**0.93 J**	**0.56 J**	**5.9**	**1.4**	0.32 B	0.26 B	0.28 B	**1.3**	**0.98 J**
Magnesium	--	--	**1,830**	**1,990**	**3,040**	**1,890**	**1,900**	**1,910**	**2,230**	**1,970**	**1,820**
Manganese	120	880	**42.6**	**53.4**	**142**	**74.2**	**49**	**46.9**	**66.2**	**55.5**	**66.2**
Nickel	110.9	730	1 B	1.1 B	**3.5 J**	1.7 B	1.1 B	0.92 B	0.73 B	1.5 B	1.3 B
Potassium	--	--	**1,460**	**1,560**	**1,930**	**1,590**	**1,600**	**1,560**	**1,570**	**1,810**	**1,600**
Selenium	5.00	180	5 U	5 U	5 U	**0.86 J**	5 U	5 U	5 U	5 U	5 U
Silver	0.36	180	1 U	**0.05 J**	**0.06 J**	1 U	1 U	1 U	1 U	**0.06 J**	**0.07 J**
Sodium	--	--	**4,340**	**5,290**	**5,980**	**4,800**	**4,980**	**5,290**	**4,700**	**4,720**	**4,640**
Vanadium	20.0	180	2 B	1.4 B	**8.3**	1.7 B	1.7 B	0.9 B	1 B	1.4 B	1.3 B
Zinc	255	11,000	**12.9 J**	**13.3 J**	**65.4**	**24.4 J**	**17.9 J**	**15.4 J**	**9.3 J**	**20.1 J**	**16.3 J**
Dissolved Metals (UG/L)											
Barium, Dissolved	4.00	7,300	**19.8**	**20.8**	**24.2**	**22**	**24.4**	**23.3**	**25.5**	**21.4**	**21.6**
Beryllium, Dissolved	0.66	73	**0.06 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	0.46	18	**0.18 J**	**0.06 J**	1 U	1 U	1 U	1 U	**0.05 J**	1 U	**0.05 J**
Calcium, Dissolved	--	--	**61,400**	**73,400**	**99,900**	**66,300**	**77,200**	**78,200**	**68,800**	**61,400**	**66,800**
Cobalt, Dissolved	23.0	11	**0.45 J**	**0.26 J**	**0.41 J**	**0.27 J**	**0.29 J**	**0.27 J**	**0.28 J**	**0.13 J**	**0.26 J**
Iron, Dissolved	1,000	26,000	**96.6 J**	**50.9 J**	**17.5 J**	**119**	**30.4 J**	**29.8 J**	**30.1 J**	**54.3 J**	**55.8 J**
Magnesium, Dissolved	--	--	**1,750**	**1,880**	**2,180**	**1,800**	**1,880**	**1,880**	**2,300**	**1,920**	**1,810**
Manganese, Dissolved	120	880	**40.3**	**43.9**	**91.5**	**91.9**	**41.5**	**38.9**	**55.9**	**11.4**	**45.6**
Nickel, Dissolved	111	730	**1 J**	**1 J**	**1.1 J**	**1.3 J**	**0.83 J**	**1.1 J**	**0.97 J**	**0.73 J**	**0.88 J**

TABLE 5-4
AOC 3 Surface Water Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID		**CLEAN RSLs Tapwater X 10**	CAS04-SW01	CAS04-SW02	CAS04-SW03	CAS04-SW04	CAA03-SW01		CAA03-SW02	CAA03-SW03	CAA03-SW04
Sample ID			CAS04-SW01-1209	CAS04-SW02-1209	CAS04-SW03-1209	CAS04-SW04-1209	CAA03-SW01-1209	CAA03-SW01P-1209	CAA03-SW02-1209	CAA03-SW03-1209	CAA03-SW04-1209
Sample Date	**ECO Risk**		12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09
Chemical Name											
Potassium, Dissolved	--	--	**1,460**	**1,440**	**1,380**	**1,540**	**1,510**	**1,500**	**1,600**	**1,600**	**1,550**
Silver, Dissolved	0.36	180	**0.1 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium, Dissolved	--	--	**4,580**	**5,040**	**5,910**	**4,740**	**5,150**	**5,160**	**5,020**	**4,520**	**4,940**
Dissolved Metals (UG/L)											
Vanadium, Dissolved	20.0	180	0.86 B	0.92 B	5 U	5 U	0.92 B	0.91 B	5 U	**0.72 J**	5 U
Wet Chemistry											
Hardness (ug/l)	--	--	**166,000**	**209,000**	**276,000**	**181,000**	**196,000**	NA	**179,000**	**170,000**	**169,000**

Notes:
Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
L - Analyte present, value may be biased low, actual value may be higher
U - The material was analyzed for, but not detected
UG/L - Micrograms per liter

TABLE 5-5
AOC 3 Surface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil X 10	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04		CAS04-SD01		CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAA03-SD01-1209A	CAA03-SD02-1209A	CAA03-SD03-1209A	CAA03-SD04-1209A	CAS004-4-SED01-00-1199	CAS004-4-SD02-00-1199	CAS004-4-SD03-00-1199	CAS004-4-SD04-00-1199	CAS004-4-SD04-00D-1199	CAS04-SD01-1209A	CAS04-SD01P-1209A	CAS04-SD02-1209A	CAS04-SD03-1209A	CAS04-SD04-1209A
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99	11/13/99	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Depth			0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Chemical Name																
Volatile Organic Compounds (UG/KG)																
2-Butanone	581	28,000,000	40 UJ	39 J	36 UJ	56 J	12 J	15 B	17.5 U	10 B	12 B	26 UJ	31 UJ	42 UJ	37 UJ	21 J
Acetone	--	61,000,000	140 J	270 J	74 J	250 J	37 B	44 B	17 B	23 B	36 B	210 J	33 B	34 B	13 B	100 J
Carbon disulfide	1.83	820,000	8 UJ	21 UJ	2 J	3 J	15.8 U	20.5 UL	17.5 U	19.9 U	26.4 U	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Ethylbenzene	--	54,000	8 UJ	21 UJ	7 UJ	7 UJ	2 J	20.5 UL	17.5 U	3 J	26.4 U	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Methyl acetate	--	78,000,000	15 UJ	38 UJ	13 UJ	5 J	NA	NA	NA	NA	NA	9 UJ	11 UJ	15 UJ	13 UJ	10 R
Methylcyclohexane	--	--	8 UJ	4 J	7 UJ	7 UJ	NA	NA	NA	NA	NA	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Tetrachloroethene	1,140	5,500	50 J	49 J	5 J	11 J	15.8 U	20.5 UL	17.5 U	19.9 U	26.4 U	5 UJ	11 J	8 J	28 J	42 J
Toluene	--	5,000,000	8 UJ	21 UJ	7 UJ	7 UJ	15.8 U	3 L	17.5 U	19.9 U	26.4 U	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Xylene, total	--	630,000	24 UJ	64 UJ	22 UJ	21 UJ	15.8 U	20.5 UL	17.5 U	10 J	26.4 U	16 UJ	19 UJ	26 UJ	22 UJ	16 UJ
Semivolatile Organic Compounds (UG/KG)																
2-Methylnaphthalene	70.0	310,000	29 UL	19 J	29 UL	6.1 L	550 U	1,200 U	530 U	1,200 U	1,600 U	25 UL	24 UL	34 UL	4 L	25 UL
Acenaphthene	290	3,400,000	29 U	300	4.9 J	3.2 J	550 U	1,200 U	530 U	1,200 U	1,600 U	25 U	24 U	2.9 J	4.3 J	7.9 J
Acenaphthylene	160	3,400,000	1.8 J	34 J	5 J	2.6 J	550 U	1,200 U	530 U	1,200 U	1,600 U	25 U	24 U	2.3 J	120	83 K
Anthracene	57.2	17,000,000	4.6 J	66 J	16 J	4.1 J	550 U	1,200 U	530 U	1,200 U	1,600 U	2.8 J	24 U	5.6 J	260	75 K
Benzo(a)anthracene	108	1,500	33 B	260	110	16 B	140 J	260 J	170 J	290 J	270 J	19 B	9 B	35 B	1,300	1,500
Benzo(a)pyrene	150	150	31 J	250	120	13 B	160 J	260 J	170 J	330 J	340 J	17 B	9 B	36	2,100	1,500
Benzo(b)fluoranthene	240	1,500	62 J	420	280	31 B	220 J	370 J	330 J	450 J	550 J	34 B	16 B	76	3,900	3,300
Benzo(g,h,i)perylene	170	1,700,000	8.3 B	83 J	65 L	27 UL	56 J	130 J	84 J	1,200 U	180 J	25 UL	24 UL	7.1 B	1,900 L	490 J
Benzo(k)fluoranthene	240	15,000	19 B	130	82	8.5 B	120 J	290 J	170 J	420 J	440 J	12 B	6.3 B	24 J	1,600	1,100
bis(2-Ethylhexyl)phthalate	750	350,000	140 U	420 U	150 U	130 U	110 J	170 J	160 J	140 J	280 J	120 U	120 U	170 U	120 J	130 U
Carbazole	140	--	6.7 B	34 J	19 J	27 U	550 U	1,200 U	530 U	1,200 U	1,600 U	5 B	24 U	8.6 B	31	49 K
Chrysene	166	150,000	30 J	280	150	19 J	190 J	400 J	240 J	460 J	490 J	18 J	9.2 J	35	2,700	1,900
Dibenz(a,h)anthracene	33.0	150	6.8 B	110 J	27 B	27 U	550 U	1,200 U	530 U	1,200 U	1,600 U	25 U	24 U	34 U	660	320 K
Di-n-butylphthalate	110	6,100,000	140 U	420 U	150 U	130 U	64 J	1,200 U	81 J	1,200 U	1,600 U	120 U	120 U	170 U	72 J	130 U
Fluoranthene	423	2,300,000	75	510	260	37	260 J	640 J	410 J	600 J	580 J	42	22 J	72	320	1,800
Fluorene	77.4	2,300,000	29 U	420	6.1 B	27 U	550 U	1,200 U	530 U	1,200 U	1,600 U	25 U	24 U	34 U	14 B	12 B
Indeno(1,2,3-cd)pyrene	200	1,500	19 B	230	81	27 U	550 U	160 J	95 J	1,200 U	210 J	9.9 B	4.9 B	23 B	2,800	1,500
Naphthalene	176	36,000	29 U	280	29 U	5.7 J	550 U	1,200 U	530 U	1,200 U	1,600 U	25 U	24 U	34 U	6.6 J	25 U
PAH (HMW)	2,900	--	223	2,143	1,122	130	1,666	3,040	1,874	4,360	3,870	127	75.8	285	18,060	15,410
PAH (LMW)	786	--	192	2,091	432	105	2,305	5,170	2,475	5,140	6,510	140	118	190	835	2,209
PAH (total)	3,553	--	415	4,234	1,554	234	3,971	8,210	4,349	9,500	10,380	267	194	474	18,895	17,619
Pentachlorophenol	1,084	30,000	140 UL	110 J	150 UL	130 UL	1,400 U	3,100 U	1,300 U	3,000 U	4,000 U	120 UL	120 UL	170 UL	150 UL	24 L
Phenanthrene	204	17,000,000	38	420	100	19 J	120 J	330 J	210 J	340 J	330 J	20 J	12 J	39	98	200 K
Pyrene	195	1,700,000	57	380	220	36	230 J	570 J	350 J	610 J	590 J	38	20 J	64	1,100	3,800
Pesticide/Polychlorinated Biphenyls (UG/KG)																
4,4'-DDD	4.88	20,000	3.6 B	97 J	6.6 J	48 J	5.5 U	6 UL	5.2 U	6 UL	7.8 UL	2.6 B	4.1 U	5.6 U	380 J	310
4,4'-DDE	3.16	14,000	1 B	11 J	2.1 B	12 J	5.5 U	6 UL	5.2 U	9 L	7.8 UL	1.9 B	0.92 J	1.8 J	600 J	160 L
4,4'-DDT	4.16	17,000	4.8 UJ	97 J	6.3 J	8.7 J	5.5 U	6 UL	5.2 U	6 UL	7.8 UL	2.7 B	2.1 J	5.6 U	1,600 J	55 J
Aldrin	2.00	290	2.5 UJ	7.1 UJ	2.4 UL	0.85 J	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL	2.4 UJ	2.1 U	2.9 U	2.7 UL	2.2 UJ
alpha-Chlordane	3.24	16,000	2.5 UJ	7.1 UJ	2.4 UL	1.7 J	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL	2.4 UJ	2.1 U	2.9 U	17 J	2.2 UJ
Aroclor-1248	59.8	2,200	27 U	79 UL	27 U	26 U	55 U	60 UL	52 U	19 L	78 UL	27 UJ	24 U	32 U	300 U	25 U
Aroclor-1254	59.8	1,100	24 U	71 UL	24 U	24 U	55 U	60 UL	52 U	60 UL	78 UL	24 UJ	21 U	29 U	21,000	22 U
Aroclor-1260	59.8	2,200	160 J	1,200 L	160	100	270 K	91 L	52 U	240 L	25 JP	30 J	25	200	280 U	50 K
Dieldrin	1.90	300	1.7 J	14 UJ	2.4 B	4.4 UJ	5.5 U	6 UL	5.2 U	6 UL	7.8 UL	4.6 UJ	4.1 U	1.8 J	1,400 J	47 K
Endosulfan I	6.24	370,000	2.5 UJ	7.1 UJ	2.4 UL	1.6 J	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL	2.4 UJ	2.1 U	1.7 J	58 L	2.2 UJ
Endosulfan II	30.1	370,000	4.8 UJ	110 J	4.7 UL	1.3 J	5.5 U	6 UL	5.2 U	6 UL	7.8 UL	4.6 UJ	4.1 U	5.6 U	830 J	4.3 UJ
Endosulfan sulfate	11.6	370,000	4.8 UJ	14 UJ	35 J	14 J	5.5 U	6 UL	5.2 U	6 UL	7.8 UL	4.6 UJ	4.1 U	5.6 U	5.2 UL	4.3 UJ
Endrin	2.22	18,000	17 J	14 UJ	4.7 UL	4.4 UJ	5.5 U	6 UL	5.2 U	6 UL	7.8 UL	4.6 UJ	4.1 U	9.6	1,200	4.3 UJ
Endrin aldehyde	2.22	18,000	3.3 J	14 UJ	4.2 J	4.4 UJ	5.5 U	6 UL	5.2 U	6 UL	7.8 UL	4.6 UJ	4.1 U	5.6 U	290 J	4.3 UJ
gamma-Chlordane	3.24	16,000	2.5 UJ	11 J	1.1 L	2.1 J	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL	2.4 UJ	2.1 U	2 J	780 J	14 L
Heptachlor	146	1,100	2.5 UJ	7.1 UJ	2.4 UL	0.69 J	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL	2.4 UJ	2.1 U	2.9 U	2.7 UL	2.2 UJ
Heptachlor epoxide	2.47	530	2.5 UJ	7.1 UJ	2.4 UL	2.3 UJ	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL	2.4 UJ	2.1 U	2.9 U	540 J	2.2 UJ
Methoxychlor	--	310,000	25 UJ	71 UJ	24 UL	23 UJ	28 U	31 UL	27 U	31 UL	40 UL	24 UJ	21 U	29 U	520 J	22 UJ
Explosives (UG/KG)																
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)																
Aluminum	25,500	77,000	17,800	15,000	6,490	5,090	8,340 L	6,070 L	5,950 L	4,210 L	4,070 L	5,440	5,150	5,560	20,400	11,800
Antimony	3.00	31	0.5 L	2.2 L	0.79 UL	0.86 UL	1.7 B	0.67 U	0.62 U	0.65 U	0.65 U	0.83 UL	0.72 UL	1.3 UL	2 L	0.83 UL
Arsenic	9.79	3.9	17.9 K	43.6 L	6.8 K	7.4 K	12.2 L	4.5	3.2	8.8	7.2	3.5 K	2.7 K	3.5 K	8.6 K	4.5 K
Barium	20.0	15,000	56	118	21.6	80.1	71.7 J	27.1 J	24.9 J	27.5 J	23.6 J	11.7	9.9	25.3	80.8	166
Beryllium	--	160	0.98	0.87 J	0.4 J	0.3 J	0.73 B	0.56 J	0.6 J	0.36 J	0.22 J	0.25 J	0.22 J	0.28 J	0.78	0.49 J
Cadmium	0.99	70	0.45	2.9	0.6	0.46	5.7	3.2	2.9	0.79 J	0.52 J	0.11	0.07 J	0.39	4.7	0.24
Calcium	--	--	12,400	15,400	2,060	1,570	25,200	4,550 J	3,380 J	4,310 J	3,400 J	704	601	12,300	9,290	2,130
Chromium	43.4	2.9	43.1 K	29.2 L	12.7 K	8.9 K	35.8	17.9	17.2	9.5	7.7	11.1 K	9.8 K	9.6 K	49.7 K	17 K
Cobalt	50.0	23	3.6 J	3.2 J	1.8 J	1.3 J	4.6 J	3.9 J	2.9 J	1.8 U	1.8 U	0.97 J	0.83 J	1.2 J	5.1 J	2.5 J
Copper	31.6	3,100	4.1	85.3 J	26.3	7.6	30.7	62.7 J	65.3 J	33.5 J	21.2 J	3.3	2.6	11.1	142	6.9
Iron	20,000	55,000	24,700 J	23,900	9,860 J	6,910 J	15,400	14,300 L	14,100	9,410 L	8,490 L	7,430 J	6,370 J	7,030 J	25,900 J	12,600 J
Lead	35.8	4,000	13.5	41.8	15.9	230	52.3	24.6	20.3	20.6	16	9.2	6.8	17.2	417	200
Magnesium	--	--	2,500 K	2,690	1,010 K	499 K	2,790	1,730	1,780	1,070 J	912 J	626 K	563 K	652 K	2,010 K	909 K

TABLE 5-5
AOC 3 Surface Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil X 10	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04		CAS04-SD01		CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAA03-SD01-1209A	CAA03-SD02-1209A	CAA03-SD03-1209A	CAA03-SD04-1209A	CAS004-4-SED01-00-1199	CAS004-4-SD02-00-1199	CAS004-4-SD03-00-1199	CAS004-4-SD04-00-1199	CAS004-4-SD04-00D-1199	CAS04-SD01-1209A	CAS04-SD01P-1209A	CAS04-SD02-1209A	CAS04-SD03-1209A	CAS04-SD04-1209A
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99	11/13/99	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Depth			0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Chemical Name																
Manganese	460	1,800	**37.3 J**	**119**	**59.1 J**	**17.3 J**	**62**	**93.4**	**74.9**	**72.7**	**60**	**14.8 J**	**14.2 J**	**43.2 J**	**140 J**	**101 J**
Mercury	0.18	23	**0.03 J**	**0.14**	**0.02 J**	**0.02 J**	**0.07 J**	0.04 UL	0.03 UL	0.04 UL	**0.04 L**	**0.02 J**	**0.02 J**	**0.05 J**	**0.62**	**0.01 J**
Nickel	22.7	1,500	**10.7**	**13.4**	**4**	**3.3 J**	**23.6**	**7.9 J**	**7.3 J**	**5 J**	**4.5 J**	**2.2 J**	**2.1 J**	**3.5 J**	**16.6**	**4.4**
Total Metals (MG/KG)																
Potassium	--	--	**2,170 K**	**1,100 K**	**1,210 K**	**560 K**	**1,210 J**	**1,290 J**	**1,550**	352 B	368 B	**637 K**	**598 K**	**504 K**	**1,580 K**	**771 K**
Selenium	2.00	390	0.43 B	**1.4 J**	0.36 B	0.24 B	1.1 U	0.91 U	0.84 U	0.89 U	0.88 U	0.44 B	0.36 B	0.67 B	0.57 B	0.31 B
Silver	1.00	390	**0.15 J**	4.1 U	**0.2 J**	**0.15 J**	5.6 B	5.1 B	3.9 B	2.8 B	2 B	**0.16 J**	**0.16 J**	**0.18 J**	**6.1**	**0.14 J**
Sodium	--	--	65.7 B	**235 J**	27 B	24.2 B	191 B	118 B	101 B	73.6 B	80.3 B	23.4 B	22.3 B	57.9 B	186 B	40.9 B
Thallium	--	--	**0.53 J**	4.1 U	1.5 U	1.6 U	0.91 UL	0.73 UL	0.67 UL	0.71 UL	0.71 UL	1.6 U	1.3 U	2.5 U	1.7 U	**0.15 J**
Vanadium	57.0	390	**53.8 K**	**38.1**	**17.2 K**	**12.3 K**	**36.6**	**21.9**	**21.1**	**15.1**	**13.2 J**	**14.6 K**	**12.8 K**	**14.7 K**	**37.6 K**	**24.2 K**
Zinc	121	23,000	**29.6 K**	**207**	**89.7 K**	**60 K**	**147**	**145**	**130**	**228**	**180**	**11.8 K**	**9.7 K**	**32.1 K**	**475 K**	**56.2 K**
Acid Volatile Sulfide/Simultaneously Extractable Metals (UMOL/G)																
Zinc, SEM	--	--	**0.0318 K**	**1.6**	**0.705 K**	**0.498 K**	NA	NA	NA	NA	NA	**0.0058 K**	NA	**0.197 K**	**1.16 K**	**0.202 K**
Acid volatile sulfide	--	--	0.15 U	**0.79**	0.15 U	**4.6**	NA	NA	NA	NA	NA	0.14 U	NA	0.18 U	0.16 U	**0.18**
Cadmium, SEM	--	--	**6.70E-04 J**	**0.0171**	**0.0021 J**	**0.0019 J**	NA	NA	NA	NA	NA	**5.00E-04 J**	NA	**0.0032**	**0.00948**	**1.40E-04 J**
Copper, SEM	--	--	**0.0135 L**	**0.397**	**0.0627 L**	**0.0068 L**	NA	NA	NA	NA	NA	**0.0076 L**	NA	**0.136 L**	**0.343 L**	**0.0431 L**
Lead, SEM	--	--	**0.0195 J**	**0.108**	**0.0327 J**	**0.527 J**	NA	NA	NA	NA	NA	**0.00611 J**	NA	**0.0611 J**	**0.303 J**	**0.276 J**
Mercury, SEM	--	--	7.60E-05 R	2.10E-04 U	7.50E-05 R	7.10E-05 R	NA	NA	NA	NA	NA	**2.80E-05 J**	NA	8.80E-05 R	**7.20E-05 J**	6.60E-05 R
Nickel, SEM	--	--	0.0045 B	**0.041 J**	0.0086 B	0.01 B	NA	NA	NA	NA	NA	0.0029 B	NA	**0.022 J**	**0.035**	0.0058 B
Silver, SEM	--	--	0.0042 UL	0.0118 U	**2.10E-04 J**	0.0039 UL	NA	NA	NA	NA	NA	0.0037 UL	NA	**4.90E-04 J**	**0.00624 J**	0.0037 UL
	--															
Wet Chemistry																
pH (ph)	--	--	**7.6**	**6.2**	**6.9**	**6.8**	NA	NA	NA	NA	NA	**6.3**	**6.9**	**7.7**	**7.6**	**7.1**
Total organic carbon (TOC) (ug/g)	--	--	**43,000**	**250,000**	**60,000**	**38,000**	NA	NA	NA	NA	NA	**25,000**	**17,000**	**62,000**	**40,000**	**16,000**

Notes:
Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

TABLE 5-6
AOC 3 Subsurfacce Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	ECO Risk	CLEAN RSLs Residential Soil X 10	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04	CAS04-SD01	
Sample ID			CAA03-SD01-1209B	CAA03-SD02-1209B	CAA03-SD03-1209B	CAA03-SD04-1209B	CAS004-4-SED01-01-1199	CAS004-4-SD02-01-1199	CAS004-4-SD03-01-1199	CAS004-4-SD04-01-1199	CAS04-SD01-1209B	CAS04-SD01P-1209B
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99	12/09/09	12/09/09
Depth			4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"
Chemical Name												
Volatile Organic Compounds (UG/KG)												
1,2-Dichlorobenzene	--	1,900,000	7 U	7 UJ	6 U	6 UJ	600 U	470 U	410 U	490 U	6 U	6 U
1,4-Dichlorobenzene	--	24,000	7 U	7 UJ	6 U	6 UJ	600 U	470 U	410 U	490 U	6 U	6 U
2-Butanone	581	28,000,000	35 U	**110 J**	30 U	**13 J**	7 B	14.9 U	13.9 U	16.0 U	28 U	30 U
4-Methyl-2-pentanone	--	5,300,000	35 U	37 UJ	30 U	32 UJ	16.9 U	14.9 U	**2 J**	16.0 U	28 U	30 U
Acetone	--	61,000,000	12 B	**420 J**	60 B	**88 J**	26 B	27 B	24 B	22 B	**190 J**	27 B
Methyl acetate	--	78,000,000	12 U	13 UJ	11 U	**4 J**	NA	NA	NA	NA	10 U	11 U
Methylcyclohexane	--	--	7 U	**2 J**	6 U	6 UJ	NA	NA	NA	NA	6 U	6 U
Tetrachloroethene	1,140	5,500	**42**	**23 J**	**9**	**8 J**	16.9 U	14.9 U	13.9 U	16.0 U	**14**	**17**
Semivolatile Organic Compounds (UG/KG)												
Acenaphthene	290	3,400,000	27 U	**90**	23 U	24 U	600 U	470 U	410 U	490 U	23 U	24 U
Acenaphthylene	160	3,400,000	27 U	31 U	23 U	24 U	600 U	470 U	410 U	490 U	23 U	24 U
Anthracene	57.2	17,000,000	**4 J**	**33**	**2.2 J**	24 U	600 U	470 U	410 U	490 U	23 U	24 U
Benzo(a)anthracene	108	1,500	28 B	**120**	15 B	24 U	**150 J**	**230 J**	410 U	**110 J**	23 U	2.7 B
Benzo(a)pyrene	150	150	**28**	**110**	16 B	24 U	**110 J**	**240 J**	410 U	**130 J**	23 U	24 U
Benzo(b)fluoranthene	240	1,500	46 B	**200**	32 B	24 U	**100 J**	**330 J**	**57 J**	**210 J**	23 U	24 U
Benzo(g,h,i)perylene	170	1,700,000	9.8 B	**29 J**	23 UL	24 UL	600 U	**100 J**	410 U	**60 J**	23 UL	24 UL
Benzo(k)fluoranthene	240	15,000	18 B	**52**	12 B	24 U	**86 J**	**280 J**	410 U	**130 J**	23 U	24 U
bis(2-Ethylhexyl)phthalate	750	350,000	140 U	150 U	120 U	**67 J**	**120 J**	**79 J**	**68 J**	**78 J**	110 U	120 U
Butylbenzylphthalate	--	2,600,000	450 U	510 U	390 U	400 U	600 U	470 U	410 U	490 U	380 U	390 U
Chrysene	166	150,000	**34**	**130**	**17 J**	24 U	**180 J**	**330 J**	**52 J**	**160 J**	23 U	**3.3 J**
Dibenz(a,h)anthracene	33.0	150	6.4 B	**45 J**	23 U	24 U	600 U	470 U	410 U	490 U	23 U	24 U
Di-n-butylphthalate	--	6,100,000	140 U	150 U	120 U	120 U	**61 J**	**62 J**	410 U	**84 J**	110 U	120 U
Fluoranthene	423	2,300,000	**49**	**250**	**42**	**5 J**	**230 J**	**520**	**87 J**	**250 J**	23 U	**4.7 J**
Fluorene	77.4	2,300,000	27 U	**180**	23 U	24 U	600 U	470 U	410 U	490 U	23 U	24 U
Indeno(1,2,3-cd)pyrene	200	1,500	31 B	**110**	9.1 B	24 U	600 U	**120 J**	410 U	**64 J**	23 U	24 U
Naphthalene	176	36,000	27 U	**53**	23 U	24 U	600 U	470 U	410 U	490 U	23 U	24 U
Phenanthrene	204	17,000,000	**34**	**210**	**18 J**	**5.7 J**	**100 J**	**240 J**	410 U	**140 J**	23 U	**2.4 J**
Pyrene	195	1,700,000	**87**	**190**	**33**	**4.8 J**	**250 J**	**470**	**84 J**	**250 J**	23 U	**4.6 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)												
4,4'-DDD	4.88	20,000	4.5 UJ	**21 J**	2 B	1.3 B	6 U	4.6 U	4.1 U	4.9 UL	4.2 UJ	0.97 B
4,4'-DDE	3.16	14,000	1 B	**4.8 J**	1.3 B	1.3 B	**6.6**	4.6 U	4.1 U	4.9 UL	4.2 UJ	0.73 B
4,4'-DDT	4.16	17,000	4.5 UJ	**19 J**	2.1 B	0.89 B	6 U	**49 J**	**400 D**	4.9 UL	4.2 UJ	3.9 UJ
alpha-Chlordane	3.24	16,000	2.3 UJ	**2.6 J**	2.1 UJ	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL	2.1 UJ	2 UJ
Aroclor-1248	--	2,200	26 UJ	29 U	24 UL	24 UJ	60 U	**33 J**	41 U	49 UL	24 UJ	22 UJ
Aroclor-1254	--	1,100	23 UJ	26 U	21 UL	21 UJ	60 U	46 U	41 U	49 UL	21 UJ	20 UJ
Aroclor-1260	59.8	2,200	**72 J**	**580**	**16 L**	22 UJ	60 U	**210**	**170**	**18 JP**	23 UJ	**7.9 J**
Dieldrin	1.90	300	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL	4.2 UJ	3.9 UJ
Endosulfan I	6.24	370,000	2.3 UJ	2.5 UJ	2.1 UJ	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL	2.1 UJ	2 UJ
Endosulfan II	30.1	370,000	4.5 UJ	**2.3 J**	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL	4.2 UJ	3.9 UJ
Endosulfan sulfate	11.6	370,000	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL	4.2 UJ	3.9 UJ
Endrin	2.22	18,000	**39 J**	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL	4.2 UJ	3.9 UJ
Endrin aldehyde	2.22	18,000	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL	4.2 UJ	3.9 UJ
Endrin ketone	--	18,000	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL	4.2 UJ	3.9 UJ
gamma-Chlordane	3.24	16,000	2.3 UJ	**3 J**	2.1 UJ	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL	2.1 UJ	2 UJ
Heptachlor epoxide	2.47	530	2.3 UJ	2.5 UJ	**0.71 J**	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL	2.1 UJ	2 UJ
Methoxychlor	--	310,000	23 UJ	25 UJ	21 UJ	21 UJ	31 U	24 U	21 U	25 UL	21 UJ	20 UJ
Explosives (UG/KG)												
No Detections			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)												
Aluminum	25,500	77,000	**10,300**	**6,100**	**20,600**	**13,500**	**5,120 L**	**2,780 L**	**1,500 L**	**3,370 L**	**25,700**	**14,000**
Antimony	3.00	31	**0.14 L**	0.76 B	**0.66 L**	0.72 UL	**1 J**	0.48 U	0.43 U	0.55 U	**0.56 L**	0.83 UL
Arsenic	9.79	3.9	**7.7 K**	**14 L**	**9.1 K**	**7.5 K**	**11.2**	**1.9 J**	**0.98 J**	**9.5**	**14.6 K**	**7.9 K**
Barium	20.0	15,000	**32.2**	**38.5**	**28.3**	**46.6**	**39.2 J**	9.9 B	6.4 B	**19.2 J**	**24.1**	**17.6**
Beryllium	--	160	**0.52 J**	**0.34 J**	**1**	**0.45 J**	0.49 B	**0.27 J**	**0.21 J**	**0.31 J**	**0.87**	**0.51 J**
Cadmium	0.99	70	**0.33**	**1.3**	**0.14**	**0.05 J**	**7.2**	**0.15 J**	**0.85 J**	**0.09 J**	**0.14**	**0.12**
Calcium	--	--	**3,750**	**4,120**	**1,740**	**1,180**	**7,010**	**1,670 J**	**1,360 J**	**15,200 J**	**5,970 J**	**1,820 J**
Chromium	43.4	2.9	**23.6 K**	**11.3 L**	**42.1 K**	**17.8 K**	**25**	**9.3**	**7.7**	**7**	**49 K**	**26.4 K**
Cobalt	50.0	23	**2 J**	**1.2 J**	**3.9 J**	**3 J**	**3.1 J**	1.3 U	1.2 U	1.5 U	**4.1 J**	**2.1 J**

TABLE 5-6
AOC 3 Subsurfacce Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**ECO Risk**	**CLEAN RSLs Residential Soil X 10**	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04	CAS04-SD01	
Sample ID			CAA03-SD01-1209B	CAA03-SD02-1209B	CAA03-SD03-1209B	CAA03-SD04-1209B	CAS004-4-SED01-01-1199	CAS004-4-SD02-01-1199	CAS004-4-SD03-01-1199	CAS004-4-SD04-01-1199	CAS04-SD01-1209B	CAS04-SD01P-1209B
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99	12/09/09	12/09/09
Depth			4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"	4-8"
Chemical Name												
Copper	31.6	3,100	**5**	**20.5 J**	**17.2**	**4.5**	**10.1**	3.8 B	7.3 B	5.1 B	**4.4**	**3.7**
Iron	20,000	55,000	**14,000 J**	**7,220**	**34,000 J**	**16,500 J**	**9,040**	**7,840 L**	**4,540 L**	**4,950 L**	**32,900 J**	**17,800 J**
Lead	35.8	4,000	**27.9**	**16.4**	**14.3**	**18.6**	**59.8**	**4.2**	**5.4**	**10.9**	**11.2**	**6.8**
Total Metals (MG/KG)												
Magnesium	--	--	**1,450 K**	**739**	**3,170 K**	**894 K**	**2,000**	**859 J**	**597 J**	**410 J**	**2,730 K**	**1,390 K**
Manganese	460	1,800	**31.8 J**	**31.2**	**34.8 J**	**23.2 J**	**26.8**	**14.5**	**12.1**	**36**	**27.4 J**	**17.6 J**
Mercury	0.18	23	**0.03 J**	**0.06**	**0.02 J**	**0.02 J**	0.04 U	0.02 UL	0.03 UL	0.03 UL	**0.02 J**	**0.01 J**
Nickel	22.7	1,500	**5.9**	**4.5**	**9.4 J**	**5.4**	**18.3**	**1.7 J**	**2 J**	**2.3 J**	**10.2**	**5.4**
Potassium	--	--	**1,330 K**	**471 K**	**4,390 K**	**852 K**	**673 J**	**1,440**	**911 J**	272 B	**2,630 K**	**1,410 K**
Silver	1.00	390	**0.12 J**	1.3 U	**0.31 J**	**0.15 J**	2.1 B	2.3 B	1.5 B	0.97 U	2.1 U	**0.14 J**
Sodium	--	--	152 B	62.7 B	47.9 B	30.7 B	65.2 B	**57 J**	59.2 B	64.3 B	100 B	63.4 B
Thallium	--	--	1.8 U	1.3 U	**0.39 J**	1.3 U	0.81 UL	0.52 UL	0.47 UL	0.6 UL	**0.52 J**	1.6 U
Vanadium	57.0	390	**30.4 K**	**14.7**	**51.4 K**	**28 K**	**25.4**	**9.6 J**	**6.8 J**	**9.8 J**	**64.3 K**	**34.2 K**
Zinc	121	23,000	**29 K**	**83.5**	**51.6 K**	**18.7 K**	87.6 B	30.2 B	44.4 B	**307**	**27.7 K**	**17.1 K**
Acid Volatile Sulfide/Simultaneously Extractable Metals (UMOL/G)												
Zinc, SEM	--	--	0.0147 B	**0.485**	**0.154 K**	**0.401 K**	NA	NA	NA	NA	0.0095 B	NA
Acid volatile sulfide	--	--	0.14 U	0.16 U	0.13 U	**0.84**	NA	NA	NA	NA	0.13 U	NA
Cadmium, SEM	--	--	**0.0011 J**	**0.0046**	**4.00E-04 J**	**0.0015 J**	NA	NA	NA	NA	**0.0013 J**	NA
Copper, SEM	--	--	**0.0094 L**	**0.227**	**0.348 L**	**0.0185 L**	NA	NA	NA	NA	**0.0126 L**	NA
Lead, SEM	--	--	**0.0149 J**	**0.0463**	**0.0197 J**	**0.621 J**	NA	NA	NA	NA	**0.00726 J**	NA
Mercury, SEM	--	--	**3.10E-05 J**	7.60E-05 U	6.30E-05 R	6.20E-05 R	NA	NA	NA	NA	6.30E-05 R	NA
Nickel, SEM	--	--	0.0032 B	**0.0239**	0.0028 B	0.0053 B	NA	NA	NA	NA	0.0018 B	NA
Silver, SEM	--	--	**2.80E-04 J**	0.0042 U	0.0035 UL	0.0035 UL	NA	NA	NA	NA	0.0035 UL	NA
Wet Chemistry												
pH (ph)	--	--	**7.1**	**6.5**	**6.1**	**6.9**	NA	NA	NA	NA	**7.5**	**7.6**
Total organic carbon (TOC) (ug/g)	--	--	**40,000**	**71,000**	**6,500**	**7,300**	NA	NA	NA	NA	**9,500**	**17,000**

Notes:
Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
J - Analyte present, value may or may not be accurate or precise
JP
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

TABLE 5-6
AOC 3 Subsurfacce Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**ECO Risk**	**CLEAN RSLs Residential Soil X 10**	CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAS04-SD02-1209B	CAS04-SD03-1209B	CAS04-SD04-1209B
Sample Date			12/09/09	12/09/09	12/09/09
Depth			4-8"	4-8"	4-8"
Chemical Name					
Volatile Organic Compounds (UG/KG)					
1,2-Dichlorobenzene	--	1,900,000	6 UJ	6 U	**2 J**
1,4-Dichlorobenzene	--	24,000	6 UJ	6 U	**6 J**
2-Butanone	581	28,000,000	32 UJ	31 U	**9 J**
4-Methyl-2-pentanone	--	5,300,000	32 UJ	31 U	33 UJ
Acetone	--	61,000,000	21 B	11 B	64 B
Methyl acetate	--	78,000,000	12 UJ	11 U	12 UJ
Methylcyclohexane	--	--	6 UJ	6 U	6 UJ
Tetrachloroethene	1,140	5,500	**13 J**	**9**	**16 J**
Semivolatile Organic Compounds (UG/KG)					
Acenaphthene	290	3,400,000	28 U	**2.6 J**	23 U
Acenaphthylene	160	3,400,000	28 U	**15 J**	**8.9 J**
Anthracene	57.2	17,000,000	**2.3 J**	**30**	**8.3 J**
Benzo(a)anthracene	108	1,500	12 B	**180**	**120 L**
Benzo(a)pyrene	150	150	12 B	**220**	**100 L**
Benzo(b)fluoranthene	240	1,500	26 B	**510**	23 U
Benzo(g,h,i)perylene	170	1,700,000	28 UL	**93 L**	23 UL
Benzo(k)fluoranthene	240	15,000	9.9 B	**140**	23 U
bis(2-Ethylhexyl)phthalate	750	350,000	140 U	**59 J**	110 U
Butylbenzylphthalate	--	2,600,000	460 U	**140 J**	380 U
Chrysene	166	150,000	**13 J**	**310**	**100 L**
Dibenz(a,h)anthracene	33.0	150	28 U	**84**	23 U
Di-n-butylphthalate	--	6,100,000	140 U	**110 J**	110 U
Fluoranthene	423	2,300,000	**30**	**140**	**170 L**
Fluorene	77.4	2,300,000	28 U	25 U	23 U
Indeno(1,2,3-cd)pyrene	200	1,500	7.1 B	**370**	**71**
Naphthalene	176	36,000	28 U	25 U	23 U
Phenanthrene	204	17,000,000	**14 J**	**38**	**11 J**
Pyrene	195	1,700,000	**26 J**	**300**	**180 L**
Pesticide/Polychlorinated Biphenyls (UG/KG)					
4,4'-DDD	4.88	20,000	4.7 UJ	**260 J**	**22 J**
4,4'-DDE	3.16	14,000	0.97 B	**270 J**	**4.4 J**
4,4'-DDT	4.16	17,000	4.7 UJ	**740 J**	2.5 B
alpha-Chlordane	3.24	16,000	2.4 UJ	**6 J**	2 UJ
Aroclor-1248	--	2,200	27 UJ	120 UJ	23 UL
Aroclor-1254	--	1,100	24 UJ	**8,900 J**	20 UL
Aroclor-1260	59.8	2,200	**39 J**	120 UJ	**25 L**
Dieldrin	1.90	300	4.7 UJ	**600 J**	**3.4 J**
Endosulfan I	6.24	370,000	2.4 UJ	**23 J**	2 UJ
Endosulfan II	30.1	370,000	4.7 UJ	**360 J**	**0.86 J**
Endosulfan sulfate	11.6	370,000	4.7 UJ	4.3 UJ	**3.2 J**
Endrin	2.22	18,000	**43 J**	**520**	4 UJ
Endrin aldehyde	2.22	18,000	4.7 UJ	**140 J**	4 UJ
Endrin ketone	--	18,000	4.7 UJ	**140 J**	4 UJ
gamma-Chlordane	3.24	16,000	2.4 UJ	**340 J**	**0.75 J**
Heptachlor epoxide	2.47	530	2.4 UJ	**230 J**	2 UJ
Methoxychlor	--	310,000	24 UJ	**230 J**	20 UJ
Explosives (UG/KG)					
No Detections			NA	NA	NA
Total Metals (MG/KG)					
Aluminum	25,500	77,000	**4,810**	**16,700**	**7,840**
Antimony	3.00	31	0.91 UL	**1.2 L**	**0.1 L**
Arsenic	9.79	3.9	**2.3 K**	**7.4 K**	**2.2 K**
Barium	20.0	15,000	**12.5**	**63.2**	**132**
Beryllium	--	160	**0.22 J**	**0.76**	**0.5**
Cadmium	0.99	70	**0.11**	**3.1**	**0.07 J**
Calcium	--	--	**2,920**	**6,900**	**1,000**
Chromium	43.4	2.9	**8.1 K**	**37.8 K**	**8.2 K**
Cobalt	50.0	23	**0.76 J**	**4.1 J**	**1.6 J**

TABLE 5-6
AOC 3 Subsurfacce Sediment Data Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Station ID	**ECO Risk**	**CLEAN RSLs Residential Soil X 10**	CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAS04-SD02-1209B	CAS04-SD03-1209B	CAS04-SD04-1209B
Sample Date			12/09/09	12/09/09	12/09/09
Depth			4-8"	4-8"	4-8"
Chemical Name					
Copper	31.6	3,100	**2.8**	**63.9**	**3.8**
Iron	20,000	55,000	**5,200 J**	**23,200 J**	**5,260 J**
Lead	35.8	4,000	**9.2**	**235**	**136**
Total Metals (MG/KG)					
Magnesium	--	--	**434 K**	**1,860 K**	**584 K**
Manganese	460	1,800	**13.1 J**	**92.4 J**	**40.1 J**
Mercury	0.18	23	**0.03 J**	**0.18**	**0.01 J**
Nickel	22.7	1,500	**1.9 J**	**22.9**	**3.3 J**
Potassium	--	--	**346 K**	**1,390 K**	**450 K**
Silver	1.00	390	1.7 U	**3.1**	**0.07 J**
Sodium	--	--	27.2 B	162 B	27.2 B
Thallium	--	--	1.7 U	1.5 U	1.3 U
Vanadium	57.0	390	**11.4 K**	**35.5 K**	**10.6 K**
Zinc	121	23,000	**13.5 K**	**325 K**	**21.2 K**
Acid Volatile Sulfide/Simultaneously Extractable Metals (UMOL/G)					
Zinc, SEM	--	--	**0.0256 K**	**0.608 K**	**0.0557 K**
Acid volatile sulfide	--	--	0.14 U	0.13 U	0.12 U
Cadmium, SEM	--	--	**6.30E-04 J**	**0.00571**	**1.70E-04 J**
Copper, SEM	--	--	**0.011 L**	**0.218 L**	**0.0049 L**
Lead, SEM	--	--	**0.0131 J**	**0.302 J**	**0.14 J**
Mercury, SEM	--	--	7.10E-05 R	**1.96E-04 J**	6.10E-05 R
Nickel, SEM	--	--	0.003 B	0.011 B	0.0012 B
Silver, SEM	--	--	0.004 UL	**0.00398 J**	0.0034 UL
Wet Chemistry					
pH (ph)	--	--	**7.8**	**8.2**	**7**
Total organic carbon (TOC) (ug/g)	--	--	**28,000**	**19,000**	**22,000**

Notes:
Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL
Bold indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in blanks
D - Compound identified in an analysis at a secondary dilution factor
J - Analyte present, value may or may not be accurate or precise
JP
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

TABLE 5-7
AOC 3 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

	Step 1			Step 2a	Step 2b	Step 3
Medium	**Site Potentially CERCLA-eligible?**	**Inorganics Above Background or Non-inorganics Detected?**	**Potentially Attributable to CERCLA Release?**	**Exceedances of Comparison Criteria?**	**Results of Qualitative Risk Evaluation Using More Realistic Assumptions**	**Is further Investigation or Action Required?**
Surface Soil	Yes	VOCs	Yes	Chloroform (>bkg & SSL)	(HH risk value not evaluated quantitatively)	Yes
				Methylene chloride (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		SVOCs	Yes	2-Methylnaphthalene (N/A)	exceeds acceptable Eco risk value as a PAH (LMW)	
				3- and 4-Methylphenol (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				Acenaphthene (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); exceeds acceptable Eco risk value	
				Acenaphthylene (>bkg & Eco)	exceeds acceptable Eco risk value	
				Anthracene (>bkg & Eco)	exceeds acceptable Eco risk value	
				Benzo(a)anthracene (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Benzo(a)pyrene (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Benzo(b)fluoranthene (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Benzo(g,h,i)perylene (>bkg & Eco)	exceeds acceptable Eco risk value	
				Benzo(k)fluoranthene (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Butylbenzylphthalate (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Carbazole (N/A)	exceeds acceptable Eco risk value based on ecological studies	
				Chrysene (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Dibenz(a,h)anthracene (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Dibenzofuran (>bkg, Res RSL, & SSL)	acceptable HH risk value	
				Fluoranthene (>bkg, Eco, Res RSL, & SSL)	acceptable HH risk; exceeds acceptable Eco risk value	
				Fluorene (>bkg & Eco)	exceeds acceptable Eco risk value	
				Indeno(1,2,3-cd)pyrene (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Naphthalene (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				PAH (HMW) (>bkg & Eco)	exceeds acceptable Eco risk value	
				PAH (LMW) (>bkg & Eco)	exceeds acceptable Eco risk value	
				Phenanthrene (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); exceeds acceptable Eco risk value	
				Pyrene (>bkg, Eco, Res RSL, & SSL)	acceptable HH risk value; exceeds acceptable Eco risk value	
		PCBs	Yes	Aroclor-1260 (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		Pesticides	Yes	4,4'-DDD (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				4,4'-DDE (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				4,4'-DDT (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				delta-BHC (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Dieldrin (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Endosulfan I (>bkg & Eco)	exceeds acceptable Eco risk value	
				Endosulfan sulfate (>bkg & Eco)	acceptable Eco risk value	
				Endrin (>bkg & Eco)	exceeds acceptable Eco risk value	
				Endrin aldehyde (>bkg & Eco)	exceeds acceptable Eco risk value	
				gamma-BHC (>bkg, Eco, Res RSL, & SSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
		Total Metals	Yes	Aluminum (>bkg & Res RSL)	acceptable HH risk value	
				Arsenic (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value	
				Chromium (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value	
				Copper (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
				Iron (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value	
				Lead (>bkg, Eco, & Res RSL)	acceptable HH risk value; acceptable Eco risk value	
				Mercury (>bkg & Eco)	acceptable Eco risk value	
				Nickel (>bkg & Eco)	acceptable Eco risk value	
				Selenium (>bkg & Eco)	acceptable Eco risk value	
				Silver (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Thallium (>bkg & Eco)	acceptable Eco risk value	
				Zinc (>bkg & Eco)	acceptable Eco risk value	

Notes:
N/A - Not applicable

TABLE 5-7
AOC 3 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1 Site Potentially CERCLA-eligible?	Inorganics Above Background or Non-inorganics Detected?	Potentially Attributable to CERCLA Release?	Step 2a Exceedances of Comparison Criteria?	Step 2b Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3 Is further Investigation or Action Required?
Subsurface Soil	Yes	VOCs	Yes	Benzene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	Yes
				Chloroform (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Ethylbenzene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Methylene chloride (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
		SVOCs	Yes	2-Methylnaphthalene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Benzo(a)anthracene (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value	
				Benzo(a)pyrene (>bkg, Res RSL, SSL)	exceeds acceptable HH risk value	
				Benzo(b)fluoranthene (>bkg, Res RSL, SSL)	exceeds acceptable HH risk value	
				Benzo(k)fluoranthene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Chrysene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Dibenz(a,h)anthracene (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value	
				Dibenzofuran (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Hexachlorobenzene (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Indeno(1,2,3-cd)pyrene (>bkg, Res RSL & SSL)	exceeds acceptable HH risk value	
				Naphthalene (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value	
		PCBs	No	N/A	N/A	
		Pesticides	Yes	4,4'-DDD (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				4,4'-DDE (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Aldrin (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				delta-BHC (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Dieldrin (>bkg, Res RSL, & SSL)	exceeds acceptable HH risk value	
				Endosulfan sulfate (>bkg & Eco)	acceptable Eco risk value	
				Endrin (>bkg & Eco)	exceeds Eco risk value	
				gamma-BHC (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				gamma-Chlordane (>bkg, Eco, & SSL)	(HH risk value not evaluated quantitatively); acceptable Eco risk value	
		Total Metals	Yes	Aluminum (>bkg, Eco, & Res RSL)	exceeds HH risk value; acceptable Eco risk value	
				Antimony (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Arsenic (>bkg, Res RSL, & SSL)	exceeds HH risk value	
				Chromium (>bkg, Res RSL, & SSL)	exceeds HH risk value	
				Cobalt (>bkg, Res RSL, & SSL)	acceptable HH risk value	
				Manganese (>bkg, Eco, Res RSL, & SSL)	exceeds HH risk value; acceptable Eco risk value	
				Selenium (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Silver (>bkg & SSL)	(HH risk value not evaluated quantitatively)	
				Vanadium (>bkg & Res RSL)	acceptable HH risk value	
				Zinc (>bkg & Eco)	acceptable Eco risk value	

Notes:
N/A - Not applicable

TABLE 5-7
AOC 3 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1 Site Potentially CERCLA-eligible?	Inorganics Above Background or Non-inorganics Detected?	Potentially Attributable to CERCLA Release?	Step 2a Exceedances of Comparison Criteria?	Step 2b Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3 Is further Investigation or Action Required?
Groundwater	Yes	VOCs	Yes	1,4-Dichlorobenzene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	Yes
				Benzene (>bkg, MCL, & Tapwater RSL)	exceeds acceptable HH risk value for groundwater and indoor air	
				Ethylbenzene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value for groundwater and indoor air	
				Xylene, total (>bkg & Tapwater RSL)	acceptable HH risk value	
		SVOCs	Yes	2-Methylnaphthalene (>bkg & Tapwater RSL)	acceptable HH risk value	
				Benzo(a)anthracene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Benzo(a)pyrene (>bkg, MCL, & Tapwater RSL)	exceeds acceptable HH risk value	
				Benzo(b)fluoranthene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Benzo(k)fluoranthene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Dibenz(a,h)anthracene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Dibenzofuran (>bkg & Tapwater RSL)	acceptable HH risk value	
				Indeno(1,2,3-cd)pyrene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Naphthalene (>bkg & Tapwater RSL)	exceeds acceptable HH risk value for groundwater and indoor air	
		PCBs	No	N/A	N/A	
		Pesticides	Yes	Dieldrin (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
		Total Metals	Yes	Aluminum (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Arsenic (>bkg, MCL, & Tapwater RSL)	exceeds acceptable HH risk value	
				Chromium (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Iron (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Manganese (>bkg & Tapwater RSL)	exceeds acceptable HH risk value	
				Mercury (>bkg, MCL, & Tapwater RSL)	acceptable HH risk value	
				Vanadium (>bkg & Tapwater RSL)	acceptable HH risk value	
Surface Water	Yes	VOCs	No	N/A	N/A	Yes
		SVOCs	Yes	Benzo(a)pyrene (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Chrysene (N/A)	exceeds acceptable Eco risk value since no screening value is avaliable	
				Pyrene (>Eco)	exceeds acceptable Eco risk value	
		PCBs	No	N/A	N/A	
		Pesticides	No	N/A	N/A	
		Total Metals	Yes	Aluminum (>Eco)	acceptable Eco risk value	
				Arsenic (>Adj Res RSL)	exceeds acceptable HH risk value	
				Barium (>Eco)	acceptable Eco risk value	
				Cadmium (>Eco)	acceptable Eco risk value	
				Copper (>Eco)	acceptable Eco risk value	
				Iron (>Eco)	acceptable Eco risk value	
				Manganese (>Eco)	acceptable Eco risk value	

Notes:
N/A - Not applicable

TABLE 5-7
AOC 3 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1: Site Potentially CERCLA-eligible?	Step 1: Inorganics Above Background or Non-inorganics Detected?	Step 1: Potentially Attributable to CERCLA Release?	Step 2a: Exceedances of Comparison Criteria?	Step 2b: Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3: Is further Investigation or Action Required?
Surface Sediment	Yes	VOCs	Yes	Carbon disulfide (>Eco)	acceptable Eco risk value	Yes
		SVOCs	Yes	2-Methylnaphthalene (N/A)	exceeds acceptable Eco risk value considering bioavailability	
				Acenaphthene (>Eco)	exceeds acceptable Eco risk value	
				Acenaphthylene (N/A)	exceeds acceptable Eco risk value considering bioavailability	
				Anthracene (>Eco)	exceeds acceptable Eco risk value	
				Benzo(a)anthracene (>Eco)	exceeds acceptable Eco risk value	
				Benzo(a)pyrene (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Benzo(b)fluoranthene (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Benzo(g,h,i)perylene (>Eco)	exceeds acceptable Eco risk value	
				Benzo(k)fluoranthene (>Eco)	exceeds acceptable Eco risk value	
				Chrysene (>Eco)	exceeds acceptable Eco risk value	
				Dibenz(a,h)anthracene (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Fluoranthene (>Eco)	exceeds acceptable Eco risk value	
				Fluorene (>Eco)	exceeds acceptable Eco risk value	
				Indeno(1,2,3-cd)pyrene (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Naphthalene (>Eco)	exceeds acceptable Eco risk value	
				PAH (HMW) (>Eco)	exceeds acceptable Eco risk value	
				PAH (LMW) (>Eco)	exceeds acceptable Eco risk value	
				PAH (total) (>Eco)	exceeds acceptable Eco risk value	
				Phenanthrene (>Eco)	exceeds acceptable Eco risk value	
				Pyrene (>Eco)	exceeds acceptable Eco risk value	
		PCBs	Yes	Aroclor-1254 (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Aroclor-1260 (>Eco)	acceptable Eco risk value	
		Pesticides	Yes	4,4'-DDD (>Eco)	exceeds acceptable Eco risk value	
				4,4'-DDE (>Eco)	exceeds acceptable Eco risk value	
				4,4'-DDT (>Eco)	exceeds acceptable Eco risk value	
				alpha-Chlordane (>Eco)	acceptable Eco risk value	
				Dieldrin (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Endosulfan I (>Eco)	exceeds acceptable Eco risk value	
				Endosulfan II (>Eco)	exceeds acceptable Eco risk value	
				Endosulfan sulfate (>Eco)	acceptable Eco risk value	
				Endrin (>Eco)	exceeds acceptable Eco risk value	
				Endrin aldehyde (>Eco)	exceeds acceptable Eco risk value	
				gamma-Chlordane (>Eco)	acceptable Eco risk value	
				Heptachlor epoxide (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Methoxychlor (N/A)	exceeds acceptable Eco risk value since no screening value is avaliable	
		Total Metals	Yes	Arsenic (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Barium (>Eco)	exceeds acceptable Eco risk value	
				Cadmium (>Eco)	exceeds acceptable Eco risk value	
				Chromium (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				Copper (>Eco)	exceeds acceptable Eco risk value	
				Iron (>Eco)	acceptable Eco risk value	
				Lead (>Eco)	exceeds acceptable Eco risk value	
				Mercury (>Eco)	acceptable Eco risk value	
				Nickel (>Eco)	acceptable Eco risk value	
				Silver (>Eco)	exceeds acceptable Eco risk value	
				Zinc (>Eco)	exceeds acceptable Eco risk value	

Notes:
N/A - Not applicable

TABLE 5-7
AOC 3 Decision Summary
CAX Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

Medium	Step 1 Site Potentially CERCLA-eligible?	Step 1 Inorganics Above Background or Non-inorganics Detected?	Step 1 Potentially Attributable to CERCLA Release?	Step 2a Exceedances of Comparison Criteria?	Step 2b Results of Qualitative Risk Evaluation Using More Realistic Assumptions	Step 3 Is further Investigation or Action Required?
Subsurface Sediment	Yes	VOCs	Yes	No	N/A	Yes
		SVOCs	Yes	Benzo(a)anthracene (>Eco)	acceptable Eco risk value	
				Benzo(a)pyrene (>Eco & Adj Res RSL)	exceeds acceptable HH risk value	
				Benzo(b)fluoranthene (>Eco)	acceptable Eco risk value	
				Benzo(k)fluoranthene (>Eco)	acceptable Eco risk value	
				Chrysene (>Eco)	acceptable Eco risk value	
				Dibenz(a,h)anthracene (>Eco)	acceptable Eco risk value	
				Fluoranthene (>Eco)	acceptable Eco risk value	
				Fluorene (>Eco)	acceptable Eco risk value	
				Indeno(1,2,3-cd)pyrene (>Eco)	acceptable Eco risk value	
				Phenanthrene (>Eco)	acceptable Eco risk value	
				Pyrene (>Eco)	acceptable Eco risk value	
		PCBs	Yes	Aroclor-1254 (>Adj Res RSL)	exceeds acceptable HH risk value	
				Aroclor-1260 (>Eco)	acceptable Eco risk value	
		Pesticides	Yes	4,4'-DDD (>Eco)	exceeds acceptable Eco risk value	
				4,4'-DDE (>Eco)	exceeds acceptable Eco risk value	
				4,4'-DDT (>Eco)	exceeds acceptable Eco risk value	
				alpha-Chlordane (>Eco)	acceptable Eco risk value	
				Dieldrin (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Endosulfan I (>Eco)	exceeds acceptable Eco risk value	
				Endosulfan II (>Eco)	exceeds acceptable Eco risk value	
				Endrin (>Eco)	exceeds acceptable Eco risk value	
				Endrin aldehyde (>Eco)	exceeds acceptable Eco risk value	
				gamma-Chlordane (>Eco)	acceptable Eco risk value	
				Heptachlor epoxide (>Eco)	exceeds acceptable Eco risk value	
				Methoxychlor (N/A)	exceeds acceptable Eco risk value since no screening value is avaliable	
		Total Metals	Yes	Aluminum (>Eco)	acceptable Eco risk value	
				Arsenic (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; acceptable Eco risk value	
				Barium (>Eco)	exceeds acceptable Eco risk value	
				Cadmium (>Eco)	exceeds acceptable Eco risk value	
				Chromium (>Eco & Adj Res RSL)	exceeds acceptable HH risk value; exceeds acceptable Eco risk value	
				Copper (>Eco)	acceptable Eco risk value	
				Iron (>Eco)	acceptable Eco risk value	
				Lead (>Eco)	exceeds acceptable Eco risk value	
				Nickel (>Eco)	acceptable Eco risk value	
				Silver (>Eco)	acceptable Eco risk value	
				Vanadium (>Eco)	acceptable Eco risk value	
				Zinc (>Eco)	acceptable Eco risk value	

Notes:
N/A - Not applicable

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\FIGURE 5-1 - AOC 3 COMPREHENSIVE INVESTIGATION LOCS.MXD MUNWIN 12/10/10

Legend

- 1999 Soil Sample
- 1999 Sediment Sample
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Study Area Boundary
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)
- 2009 SI Surface Water/Sediment Sample Location
- 2009 SI Surface Water Sample Location
- 2009 SI Sediment Sample Location
- 2009 SI DPT Soil Sample/Well Point Groundwater Sample Location
- 2009 SI Soil Sample Location
- 2009 SI Test Pit

N

0 40 80
Feet

Figure 5-1
AOC 3 Comprehensive Investigation Locations
Sites 4, 9, and AOC 3 Site Investigation
Cheatham Annex
Williamsburg, Virginia

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITES_4_9_AOC3_SI\FIGURE5-2_AOC3_EXTENT_BURIED_DEBRIS.MXD MUNWIN 9/2/10

Legend

- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Study Area Boundary
- 2009 SI Test Pit
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)
- Approximate Buried Debris Boundary
- **(1 - 4')** Depth of Buried Debris

N

0 40 80 Feet

Figure 5-2
AOC 3 Estimated Extent of Buried Debris
Sites 4, 9, and AOC 3 Site Inspection Report
Cheatham Annex
Williamsburg, Virginia

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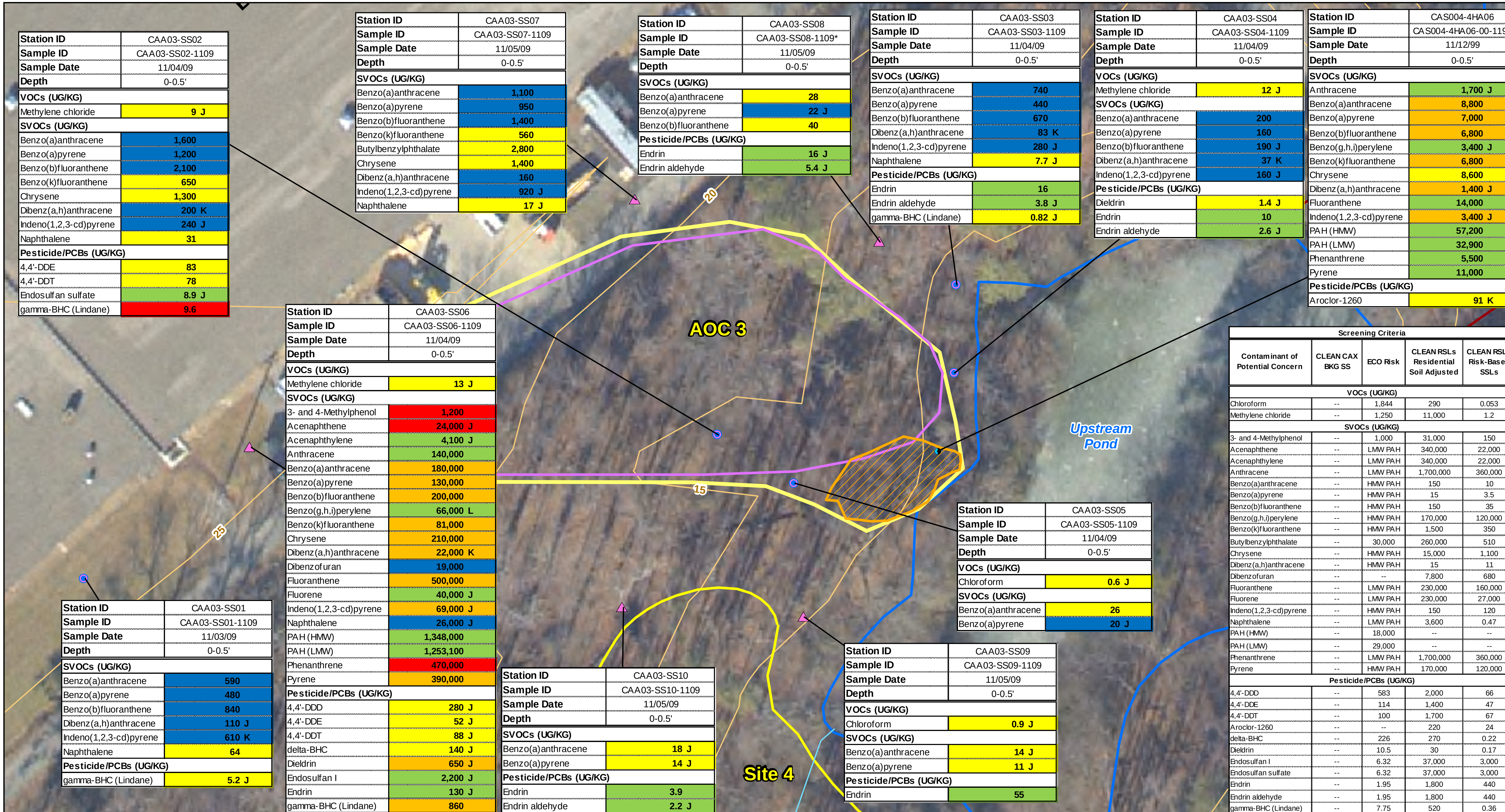
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE5-3_AOC3_SS_ORGANIC.MXD MUNWIN 12/10/10



Station ID	CAA03-SS02
Sample ID	CAA03-SS02-1109
Sample Date	11/04/09
Depth	0-0.5'
VOCs (UG/KG)	
Methylene chloride	9 J
SVOCs (UG/KG)	
Benzo(a)anthracene	1,600
Benzo(a)pyrene	1,200
Benzo(b)fluoranthene	2,100
Benzo(k)fluoranthene	650
Chrysene	1,300
Dibenz(a,h)anthracene	200 K
Indeno(1,2,3-cd)pyrene	240 J
Naphthalene	31
Pesticide/PCBs (UG/KG)	
4,4'-DDE	83
4,4'-DDT	78
Endosulfan sulfate	8.9 J
gamma-BHC (Lindane)	9.6

Station ID	CAA03-SS07
Sample ID	CAA03-SS07-1109
Sample Date	11/05/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	1,100
Benzo(a)pyrene	950
Benzo(b)fluoranthene	1,400
Benzo(k)fluoranthene	560
Butylbenzylphthalate	2,800
Chrysene	1,400
Dibenz(a,h)anthracene	160
Indeno(1,2,3-cd)pyrene	920 J
Naphthalene	17 J

Station ID	CAA03-SS08
Sample ID	CAA03-SS08-1109*
Sample Date	11/05/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	28
Benzo(a)pyrene	22 J
Benzo(b)fluoranthene	40
Pesticide/PCBs (UG/KG)	
Endrin	16 J
Endrin aldehyde	5.4 J

Station ID	CAA03-SS03
Sample ID	CAA03-SS03-1109
Sample Date	11/04/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	740
Benzo(a)pyrene	440
Benzo(b)fluoranthene	670
Dibenz(a,h)anthracene	83 K
Indeno(1,2,3-cd)pyrene	280 J
Naphthalene	7.7 J
Pesticide/PCBs (UG/KG)	
Endrin	16
Endrin aldehyde	3.8 J
gamma-BHC (Lindane)	0.82 J

Station ID	CAA03-SS04
Sample ID	CAA03-SS04-1109
Sample Date	11/04/09
Depth	0-0.5'
VOCs (UG/KG)	
Methylene chloride	12 J
SVOCs (UG/KG)	
Benzo(a)anthracene	200
Benzo(a)pyrene	160
Benzo(b)fluoranthene	190 J
Dibenz(a,h)anthracene	37 K
Indeno(1,2,3-cd)pyrene	160 J
Pesticide/PCBs (UG/KG)	
Dieldrin	1.4 J
Endrin	10
Endrin aldehyde	2.6 J

Station ID	CAS004-4HA06
Sample ID	CAS004-4HA06-00-1199
Sample Date	11/12/99
Depth	0-0.5'
SVOCs (UG/KG)	
Anthracene	1,700 J
Benzo(a)anthracene	8,800
Benzo(a)pyrene	7,000
Benzo(b)fluoranthene	6,800
Benzo(g,h,i)perylene	3,400 J
Benzo(k)fluoranthene	6,800
Chrysene	8,600
Dibenz(a,h)anthracene	1,400 J
Fluoranthene	14,000
Indeno(1,2,3-cd)pyrene	3,400 J
PAH (HMW)	57,200
PAH (LMW)	32,900
Phenanthrene	5,500
Pyrene	11,000
Pesticide/PCBs (UG/KG)	
Aroclor-1260	91 K

Station ID	CAA03-SS06
Sample ID	CAA03-SS06-1109
Sample Date	11/04/09
Depth	0-0.5'
VOCs (UG/KG)	
Methylene chloride	13 J
SVOCs (UG/KG)	
3- and 4-Methylphenol	1,200
Acenaphthene	24,000 J
Acenaphthylene	4,100 J
Anthracene	140,000
Benzo(a)anthracene	180,000
Benzo(a)pyrene	130,000
Benzo(b)fluoranthene	200,000
Benzo(g,h,i)perylene	66,000 L
Benzo(k)fluoranthene	81,000
Chrysene	210,000
Dibenz(a,h)anthracene	22,000 K
Dibenzofuran	19,000
Fluoranthene	500,000
Fluorene	40,000 J
Indeno(1,2,3-cd)pyrene	69,000 J
Naphthalene	26,000 J
PAH (HMW)	1,348,000
PAH (LMW)	1,253,100
Phenanthrene	470,000
Pyrene	390,000
Pesticide/PCBs (UG/KG)	
4,4'-DDD	280 J
4,4'-DDE	52 J
4,4'-DDT	88 J
delta-BHC	140 J
Dieldrin	650 J
Endosulfan I	2,200 J
Endrin	130 J
gamma-BHC (Lindane)	860

Station ID	CAA03-SS05
Sample ID	CAA03-SS05-1109
Sample Date	11/04/09
Depth	0-0.5'
VOCs (UG/KG)	
Chloroform	0.6 J
SVOCs (UG/KG)	
Benzo(a)anthracene	26
Benzo(a)pyrene	20 J

Station ID	CAA03-SS01
Sample ID	CAA03-SS01-1109
Sample Date	11/03/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	590
Benzo(a)pyrene	480
Benzo(b)fluoranthene	840
Dibenz(a,h)anthracene	110 J
Indeno(1,2,3-cd)pyrene	610 K
Naphthalene	64
Pesticide/PCBs (UG/KG)	
gamma-BHC (Lindane)	5.2 J

Station ID	CAA03-SS10
Sample ID	CAA03-SS10-1109
Sample Date	11/05/09
Depth	0-0.5'
SVOCs (UG/KG)	
Benzo(a)anthracene	18 J
Benzo(a)pyrene	14 J
Pesticide/PCBs (UG/KG)	
Endrin	3.9
Endrin aldehyde	2.2 J

Station ID	CAA03-SS09
Sample ID	CAA03-SS09-1109
Sample Date	11/05/09
Depth	0-0.5'
VOCs (UG/KG)	
Chloroform	0.9 J
SVOCs (UG/KG)	
Benzo(a)anthracene	14 J
Benzo(a)pyrene	11 J
Pesticide/PCBs (UG/KG)	
Endrin	55

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
VOCs (UG/KG)				
Chloroform	--	1,844	290	0.053
Methylene chloride	--	1,250	11,000	1.2
SVOCs (UG/KG)				
3- and 4-Methylphenol	--	1,000	31,000	150
Acenaphthene	--	LMW PAH	340,000	22,000
Acenaphthylene	--	LMW PAH	340,000	22,000
Anthracene	--	LMW PAH	1,700,000	360,000
Benzo(a)anthracene	--	HMW PAH	150	10
Benzo(a)pyrene	--	HMW PAH	15	3.5
Benzo(b)fluoranthene	--	HMW PAH	150	35
Benzo(g,h,i)perylene	--	HMW PAH	170,000	120,000
Benzo(k)fluoranthene	--	HMW PAH	1,500	350
Butylbenzylphthalate	--	30,000	260,000	510
Chrysene	--	HMW PAH	15,000	1,100
Dibenz(a,h)anthracene	--	HMW PAH	15	11
Dibenzofuran	--	--	7,800	680
Fluoranthene	--	LMW PAH	230,000	160,000
Fluorene	--	LMW PAH	230,000	27,000
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120
Naphthalene	--	LMW PAH	3,600	0.47
PAH (HMW)	--	18,000	--	--
PAH (LMW)	--	29,000	--	--
Phenanthrene	--	LMW PAH	1,700,000	360,000
Pyrene	--	HMW PAH	170,000	120,000
Pesticide/PCBs (UG/KG)				
4,4'-DDD	--	583	2,000	66
4,4'-DDE	--	114	1,400	47
4,4'-DDT	--	100	1,700	67
Aroclor-1260	--	--	220	24
delta-BHC	--	226	270	0.22
Dieldrin	--	10.5	30	0.17
Endosulfan I	--	6.32	37,000	3,000
Endosulfan sulfate	--	6.32	37,000	3,000
Endrin	--	1.95	1,800	440
Endrin aldehyde	--	1.95	1,800	440
gamma-BHC (Lindane)	--	7.75	520	0.36

Legend

- 2009 SI DPT Soil Sample Location
- 2009 SI Soil Sample Location
- 1999 Soil Sample
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

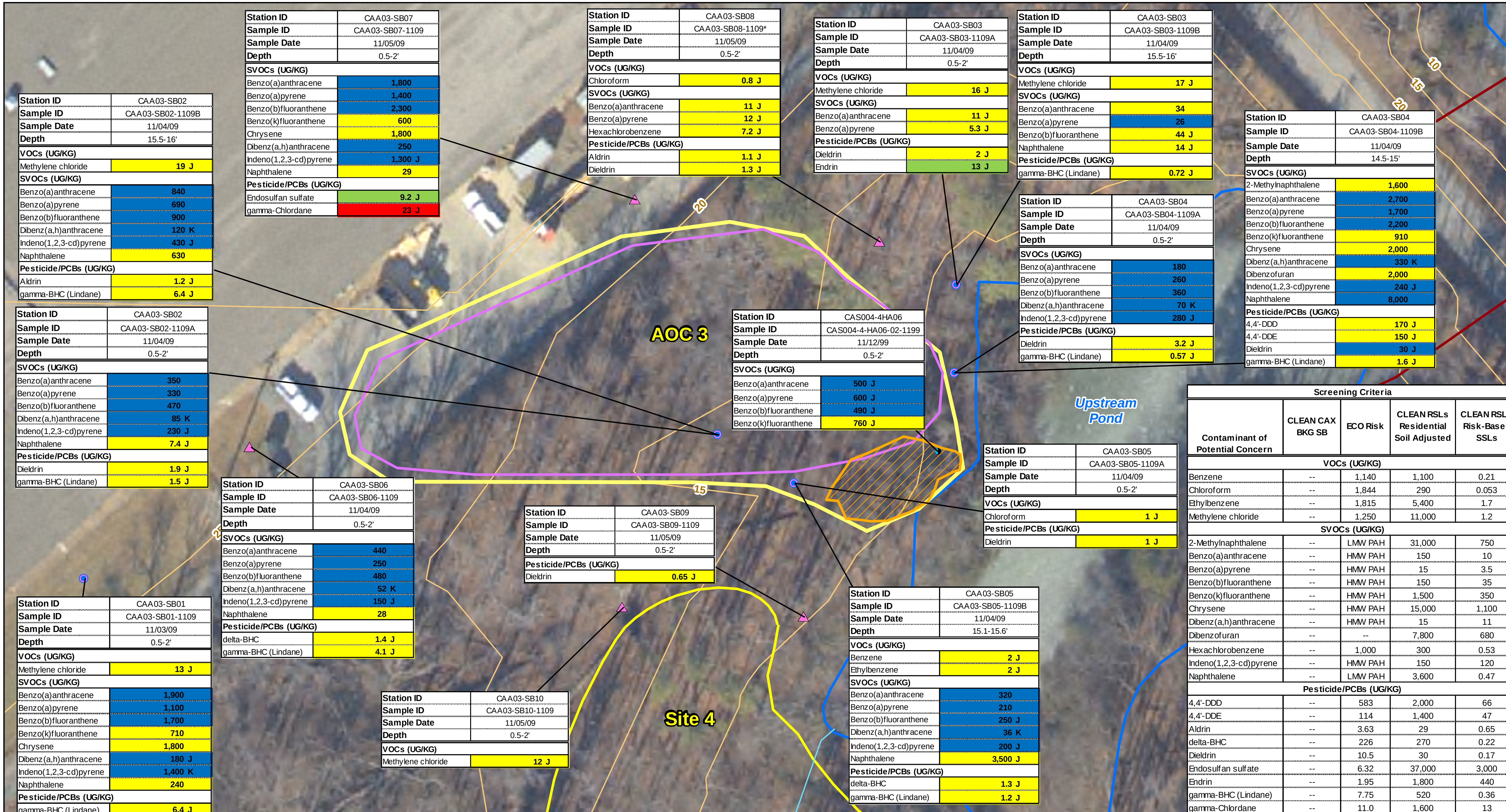
* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-3
AOC 3 Surface Soil Organics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

CH2MHILL



Station ID	CAA03-SB07
Sample ID	CAA03-SB07-1109
Sample Date	11/05/09
Depth	0.5-2'
SVOCs (UG/KG)	
Benzo(a)anthracene	1,800
Benzo(a)pyrene	1,400
Benzo(b)fluoranthene	2,300
Benzo(k)fluoranthene	600
Chrysene	1,800
Dibenz(a,h)anthracene	250
Indeno(1,2,3-cd)pyrene	1,300 J
Naphthalene	29
Pesticide/PCBs (UG/KG)	
Endosulfan sulfate	9.2 J
gamma-Chlordane	23 J

Station ID	CAA03-SB08
Sample ID	CAA03-SB08-1109*
Sample Date	11/05/09
Depth	0.5-2'
VOCs (UG/KG)	
Chloroform	0.8 J
SVOCs (UG/KG)	
Benzo(a)anthracene	11 J
Benzo(a)pyrene	12 J
Hexachlorobenzene	7.2 J
Pesticide/PCBs (UG/KG)	
Aldrin	1.1 J
Dieldrin	1.3 J

Station ID	CAA03-SB03
Sample ID	CAA03-SB03-1109A
Sample Date	11/04/09
Depth	0.5-2'
VOCs (UG/KG)	
Methylene chloride	16 J
SVOCs (UG/KG)	
Benzo(a)anthracene	11 J
Benzo(a)pyrene	5.3 J
Pesticide/PCBs (UG/KG)	
Dieldrin	2 J
Endrin	13 J

Station ID	CAA03-SB03
Sample ID	CAA03-SB03-1109B
Sample Date	11/04/09
Depth	15.5-16'
VOCs (UG/KG)	
Methylene chloride	17 J
SVOCs (UG/KG)	
Benzo(a)anthracene	34
Benzo(a)pyrene	26
Benzo(b)fluoranthene	44 J
Naphthalene	14 J
Pesticide/PCBs (UG/KG)	
gamma-BHC (Lindane)	0.72 J

Station ID	CAA03-SB02
Sample ID	CAA03-SB02-1109B
Sample Date	11/04/09
Depth	15.5-16'
VOCs (UG/KG)	
Methylene chloride	19 J
SVOCs (UG/KG)	
Benzo(a)anthracene	840
Benzo(a)pyrene	690
Benzo(b)fluoranthene	900
Dibenz(a,h)anthracene	120 K
Indeno(1,2,3-cd)pyrene	430 J
Naphthalene	630
Pesticide/PCBs (UG/KG)	
Aldrin	1.2 J
gamma-BHC (Lindane)	6.4 J

Station ID	CAA03-SB04
Sample ID	CAA03-SB04-1109B
Sample Date	11/04/09
Depth	14.5-15'
SVOCs (UG/KG)	
2-Methylnaphthalene	1,600
Benzo(a)anthracene	2,700
Benzo(a)pyrene	1,700
Benzo(b)fluoranthene	2,200
Benzo(k)fluoranthene	910
Chrysene	2,000
Dibenz(a,h)anthracene	330 K
Dibenzofuran	2,000
Indeno(1,2,3-cd)pyrene	240 J
Naphthalene	8,000
Pesticide/PCBs (UG/KG)	
4,4'-DDD	170 J
4,4'-DDE	150 J
Dieldrin	30 J
gamma-BHC (Lindane)	1.6 J

Station ID	CAA03-SB04
Sample ID	CAA03-SB04-1109A
Sample Date	11/04/09
Depth	0.5-2'
SVOCs (UG/KG)	
Benzo(a)anthracene	180
Benzo(a)pyrene	260
Benzo(b)fluoranthene	360
Dibenz(a,h)anthracene	70 K
Indeno(1,2,3-cd)pyrene	280 J
Pesticide/PCBs (UG/KG)	
Dieldrin	3.2 J
gamma-BHC (Lindane)	0.57 J

Station ID	CAA03-SB02
Sample ID	CAA03-SB02-1109A
Sample Date	11/04/09
Depth	0.5-2'
SVOCs (UG/KG)	
Benzo(a)anthracene	350
Benzo(a)pyrene	330
Benzo(b)fluoranthene	470
Dibenz(a,h)anthracene	85 K
Indeno(1,2,3-cd)pyrene	230 J
Naphthalene	7.4 J
Pesticide/PCBs (UG/KG)	
Dieldrin	1.9 J
gamma-BHC (Lindane)	1.5 J

Station ID	CAS004-4HA06
Sample ID	CAS004-4-HA06-02-1199
Sample Date	11/12/99
Depth	0.5-2'
SVOCs (UG/KG)	
Benzo(a)anthracene	500 J
Benzo(a)pyrene	600 J
Benzo(b)fluoranthene	490 J
Benzo(k)fluoranthene	760 J

Station ID	CAA03-SB05
Sample ID	CAA03-SB05-1109A
Sample Date	11/04/09
Depth	0.5-2'
VOCs (UG/KG)	
Chloroform	1 J
Pesticide/PCBs (UG/KG)	
Dieldrin	1 J

Station ID	CAA03-SB06
Sample ID	CAA03-SB06-1109
Sample Date	11/04/09
Depth	0.5-2'
SVOCs (UG/KG)	
Benzo(a)anthracene	440
Benzo(a)pyrene	250
Benzo(b)fluoranthene	480
Dibenz(a,h)anthracene	52 K
Indeno(1,2,3-cd)pyrene	150 J
Naphthalene	28
Pesticide/PCBs (UG/KG)	
delta-BHC	1.4 J
gamma-BHC (Lindane)	4.1 J

Station ID	CAA03-SB09
Sample ID	CAA03-SB09-1109
Sample Date	11/05/09
Depth	0.5-2'
Pesticide/PCBs (UG/KG)	
Dieldrin	0.65 J

Station ID	CAA03-SB01
Sample ID	CAA03-SB01-1109
Sample Date	11/03/09
Depth	0.5-2'
VOCs (UG/KG)	
Methylene chloride	13 J
SVOCs (UG/KG)	
Benzo(a)anthracene	1,900
Benzo(a)pyrene	1,100
Benzo(b)fluoranthene	1,700
Benzo(k)fluoranthene	710
Chrysene	1,800
Dibenz(a,h)anthracene	180 J
Indeno(1,2,3-cd)pyrene	1,400 K
Naphthalene	240
Pesticide/PCBs (UG/KG)	
gamma-BHC (Lindane)	6.4 J

Station ID	CAA03-SB10
Sample ID	CAA03-SB10-1109
Sample Date	11/05/09
Depth	0.5-2'
VOCs (UG/KG)	
Methylene chloride	12 J

Station ID	CAA03-SB05
Sample ID	CAA03-SB05-1109B
Sample Date	11/04/09
Depth	15.1-15.6'
VOCs (UG/KG)	
Benzene	2 J
Ethylbenzene	2 J
SVOCs (UG/KG)	
Benzo(a)anthracene	320
Benzo(a)pyrene	210
Benzo(b)fluoranthene	250 J
Dibenz(a,h)anthracene	36 K
Indeno(1,2,3-cd)pyrene	200 J
Naphthalene	3,500 J
Pesticide/PCBs (UG/KG)	
delta-BHC	1.3 J
gamma-BHC (Lindane)	1.2 J

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
VOCs (UG/KG)				
Benzene	--	1,140	1,100	0.21
Chloroform	--	1,844	290	0.053
Ethylbenzene	--	1,815	5,400	1.7
Methylene chloride	--	1,250	11,000	1.2
SVOCs (UG/KG)				
2-Methylnaphthalene	--	LMW PAH	31,000	750
Benzo(a)anthracene	--	HMW PAH	150	10
Benzo(a)pyrene	--	HMW PAH	15	3.5
Benzo(b)fluoranthene	--	HMW PAH	150	35
Benzo(k)fluoranthene	--	HMW PAH	1,500	350
Chrysene	--	HMW PAH	15,000	1,100
Dibenz(a,h)anthracene	--	HMW PAH	15	11
Dibenzofuran	--	--	7,800	680
Hexachlorobenzene	--	1,000	300	0.53
Indeno(1,2,3-cd)pyrene	--	HMW PAH	150	120
Naphthalene	--	LMW PAH	3,600	0.47
Pesticide/PCBs (UG/KG)				
4,4'-DDD	--	583	2,000	66
4,4'-DDE	--	114	1,400	47
Aldrin	--	3.63	29	0.65
delta-BHC	--	226	270	0.22
Dieldrin	--	10.5	30	0.17
Endosulfan sulfate	--	6.32	37,000	3,000
Endrin	--	1.95	1,800	440
gamma-BHC (Lindane)	--	7.75	520	0.36
gamma-Chlordane	--	11.0	1,600	13

Legend

- 2009 SI DPT Soil Sample Location
- 2009 SI Soil Sample Location
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds BKG & ECO
Exceeds BKG & SSL
Exceeds BKG & RSL
Exceeds BKG, ECO & SSL
Exceeds BKG, RSL & SSL
Exceeds BKG, ECO & RSL
Exceeds BKG, ECO, RSL & SSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-4
AOC 3 Subsurface Soil Organics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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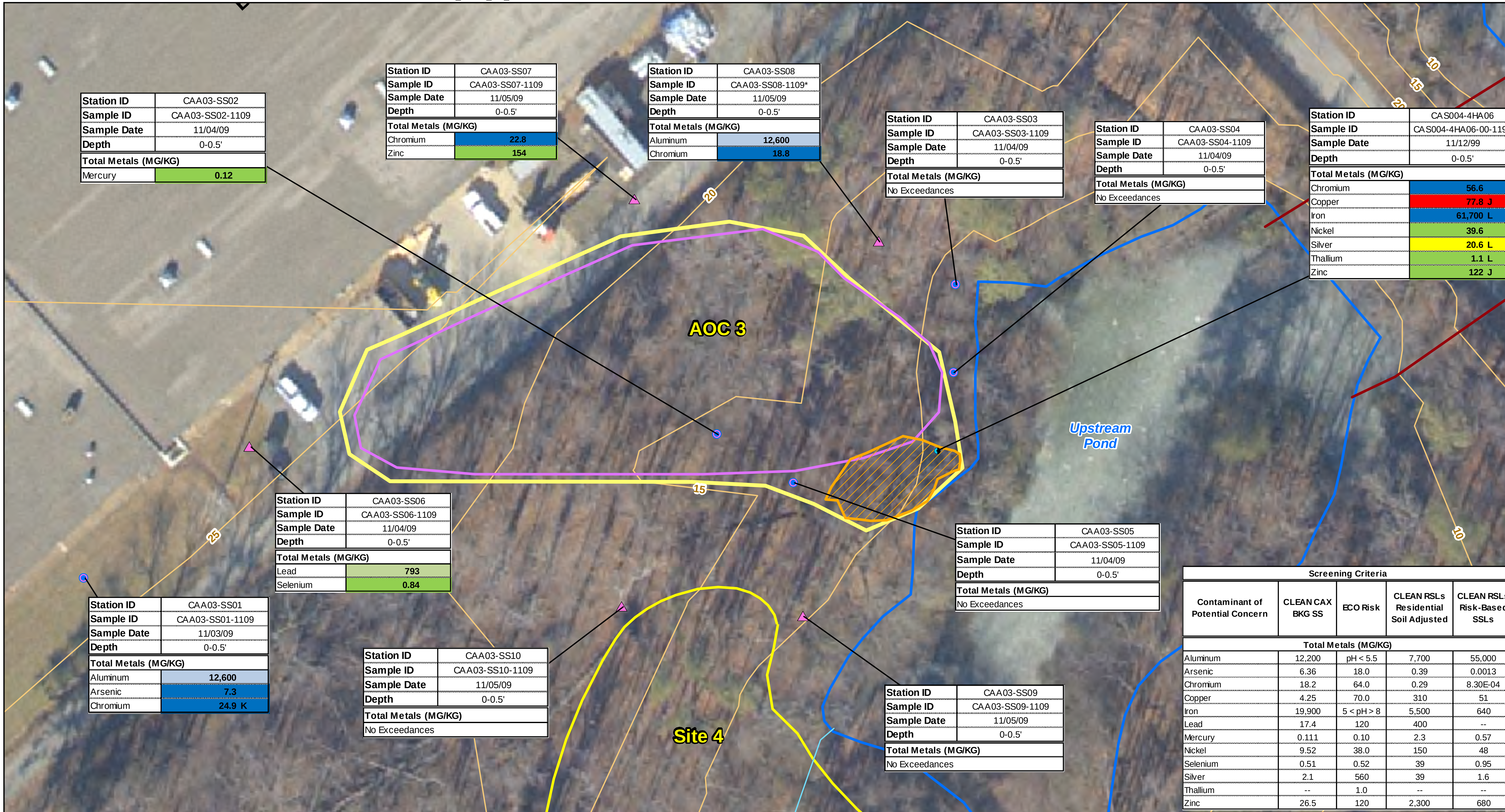
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE5-5_AOC3_SS_INORGANIC.MXD MUNWIN 11/30/10



Station ID	CAA03-SS02
Sample ID	CAA03-SS02-1109
Sample Date	11/04/09
Depth	0-0.5'
Total Metals (MG/KG)	
Mercury	0.12

Station ID	CAA03-SS07
Sample ID	CAA03-SS07-1109
Sample Date	11/05/09
Depth	0-0.5'
Total Metals (MG/KG)	
Chromium	22.8
Zinc	154

Station ID	CAA03-SS08
Sample ID	CAA03-SS08-1109*
Sample Date	11/05/09
Depth	0-0.5'
Total Metals (MG/KG)	
Aluminum	12,600
Chromium	18.8

Station ID	CAA03-SS03
Sample ID	CAA03-SS03-1109
Sample Date	11/04/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAA03-SS04
Sample ID	CAA03-SS04-1109
Sample Date	11/04/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAS004-4HA06
Sample ID	CAS004-4HA06-00-1199
Sample Date	11/12/99
Depth	0-0.5'
Total Metals (MG/KG)	
Chromium	56.6
Copper	77.8 J
Iron	61,700 L
Nickel	39.6
Silver	20.6 L
Thallium	1.1 L
Zinc	122 J

Station ID	CAA03-SS06
Sample ID	CAA03-SS06-1109
Sample Date	11/04/09
Depth	0-0.5'
Total Metals (MG/KG)	
Lead	793
Selenium	0.84

Station ID	CAA03-SS05
Sample ID	CAA03-SS05-1109
Sample Date	11/04/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAA03-SS01
Sample ID	CAA03-SS01-1109
Sample Date	11/03/09
Depth	0-0.5'
Total Metals (MG/KG)	
Aluminum	12,600
Arsenic	7.3
Chromium	24.9 K

Station ID	CAA03-SS10
Sample ID	CAA03-SS10-1109
Sample Date	11/05/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Station ID	CAA03-SS09
Sample ID	CAA03-SS09-1109
Sample Date	11/05/09
Depth	0-0.5'
Total Metals (MG/KG)	
No Exceedances	

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SS	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
Total Metals (MG/KG)				
Aluminum	12,200	pH < 5.5	7,700	55,000
Arsenic	6.36	18.0	0.39	0.0013
Chromium	18.2	64.0	0.29	8.30E-04
Copper	4.25	70.0	310	51
Iron	19,900	5 < pH > 8	5,500	640
Lead	17.4	120	400	--
Mercury	0.111	0.10	2.3	0.57
Nickel	9.52	38.0	150	48
Selenium	0.51	0.52	39	0.95
Silver	2.1	560	39	1.6
Thallium	--	1.0	--	--
Zinc	26.5	120	2,300	680

Legend

- 2009 SI DPT Soil Sample Location
- 2009 SI Soil Sample Location
- 1999 Soil Sample
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-5
AOC 3 Surface Soil Inorganics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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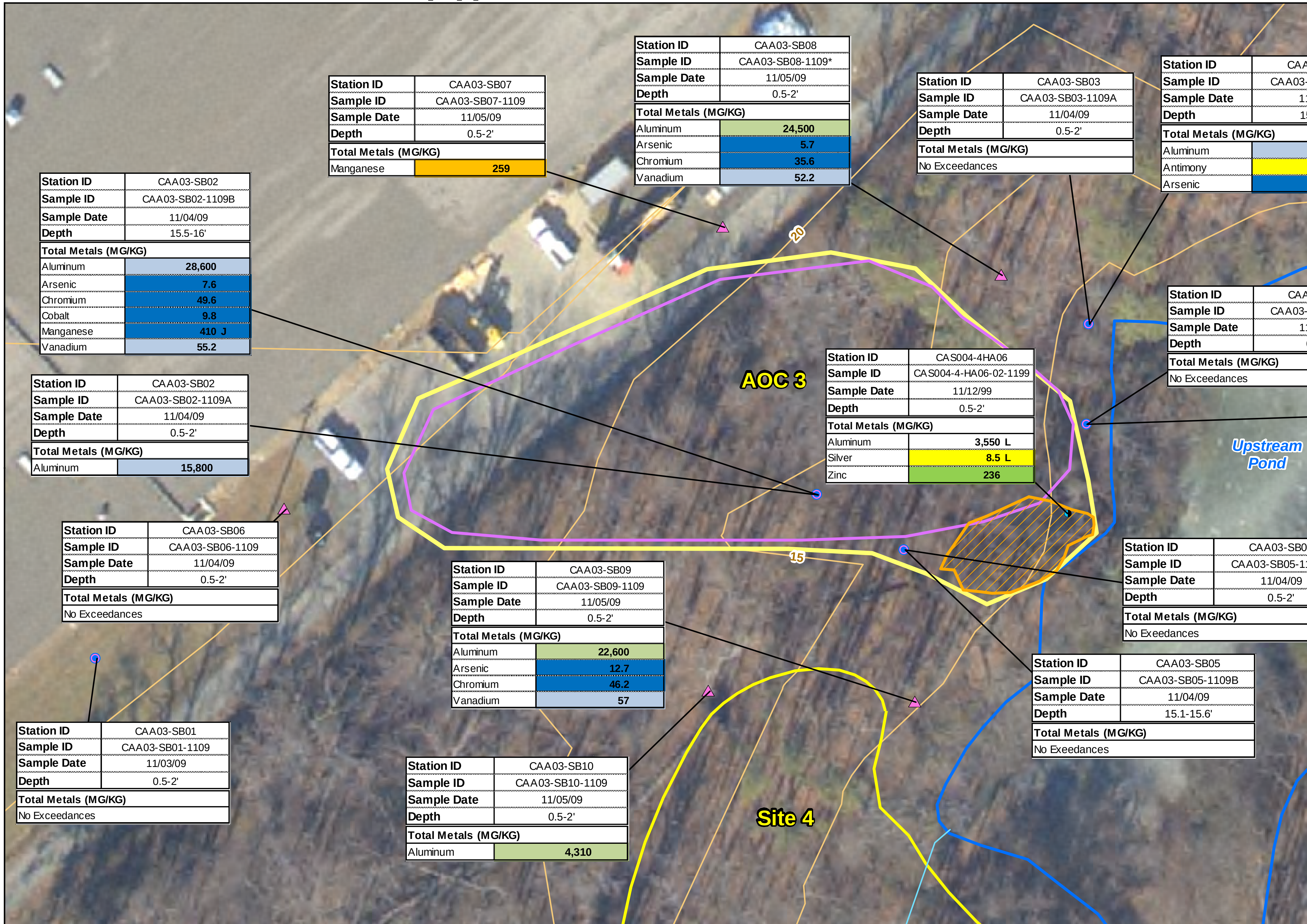

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG SB	ECO Risk	CLEAN RSLs Residential Soil Adjusted	CLEAN RSLs Risk-Based SSLs
Total Metals (MG/KG)				
Aluminum	13,000	pH < 5.5	7,700	55,000
Antimony	--	78.0	3.1	0.66
Arsenic	5.54	18.0	0.39	0.0013
Chromium	33.7	64.0	0.29	8.30E-04
Cobalt	5.18	13.0	2.3	0.49
Manganese	176	220	180	57
Selenium	0.64	0.52	39	0.95
Silver	1.1	560	39	1.6
Vanadium	48.3	130	39	180
Zinc	28	120	2,300	680

Legend

- 2009 SI DPT Soil Sample Location
- 2009 SI Soil Sample Location
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

- Exceeds BKG & ECO
- Exceeds BKG & SSL
- Exceeds BKG & RSL
- Exceeds BKG, ECO & SSL
- Exceeds BKG, RSL & SSL
- Exceeds BKG, ECO & RSL
- Exceeds BKG, ECO, RSL & SSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-6
AOC 3 Subsurface Soil Inorganics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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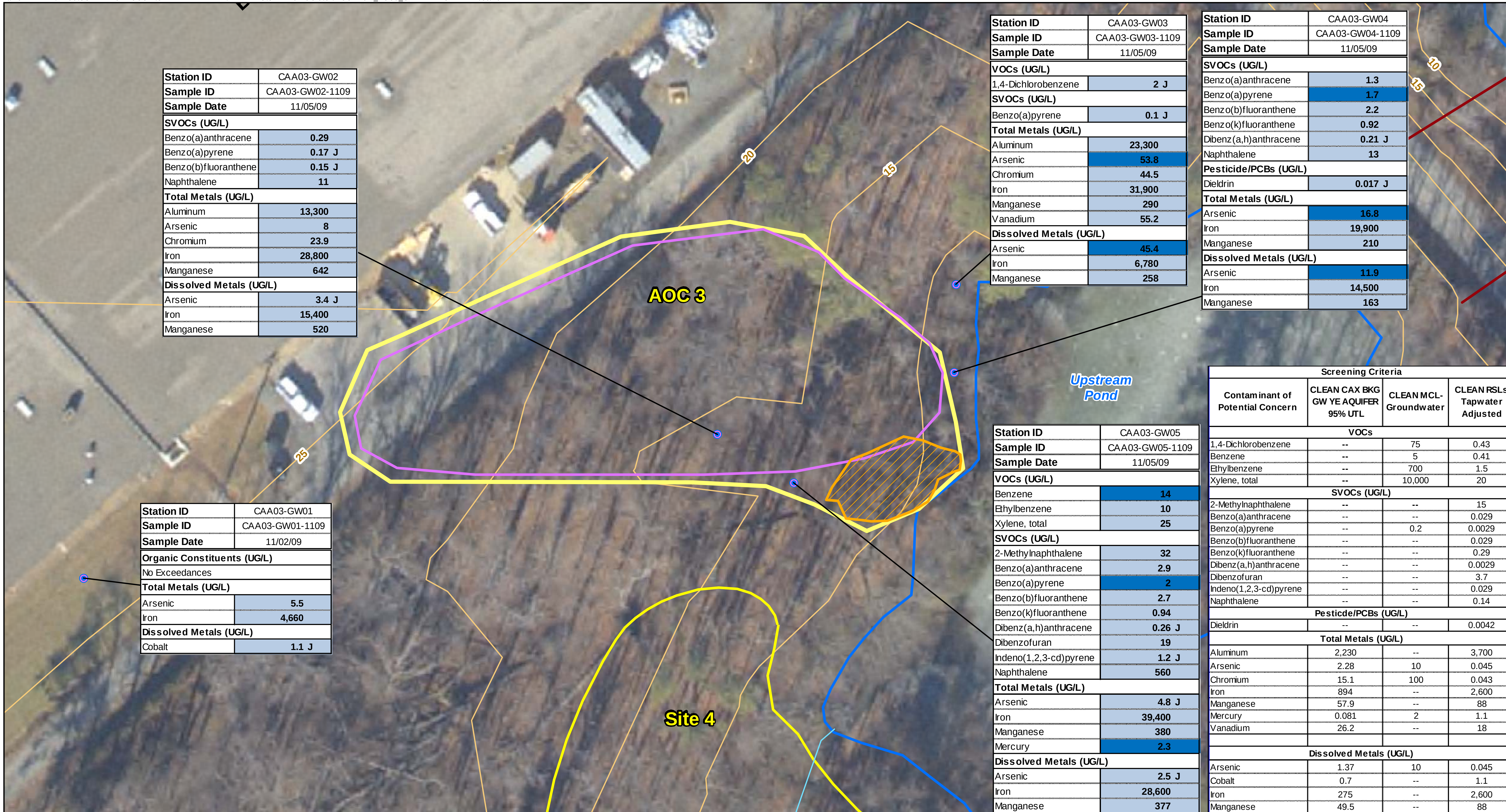
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE5-7_AOC3_GW.MXD MUNWIN 11/30/10



Station ID	CAA03-GW02
Sample ID	CAA03-GW02-1109
Sample Date	11/05/09
SVOCs (UG/L)	
Benzo(a)anthracene	0.29
Benzo(a)pyrene	0.17 J
Benzo(b)fluoranthene	0.15 J
Naphthalene	11
Total Metals (UG/L)	
Aluminum	13,300
Arsenic	8
Chromium	23.9
Iron	28,800
Manganese	642
Dissolved Metals (UG/L)	
Arsenic	3.4 J
Iron	15,400
Manganese	520

Station ID	CAA03-GW03
Sample ID	CAA03-GW03-1109
Sample Date	11/05/09
VOCs (UG/L)	
1,4-Dichlorobenzene	2 J
SVOCs (UG/L)	
Benzo(a)pyrene	0.1 J
Total Metals (UG/L)	
Aluminum	23,300
Arsenic	53.8
Chromium	44.5
Iron	31,900
Manganese	290
Vanadium	55.2
Dissolved Metals (UG/L)	
Arsenic	45.4
Iron	6,780
Manganese	258

Station ID	CAA03-GW04
Sample ID	CAA03-GW04-1109
Sample Date	11/05/09
SVOCs (UG/L)	
Benzo(a)anthracene	1.3
Benzo(a)pyrene	1.7
Benzo(b)fluoranthene	2.2
Benzo(k)fluoranthene	0.92
Dibenz(a,h)anthracene	0.21 J
Naphthalene	13
Pesticide/PCBs (UG/L)	
Dieldrin	0.017 J
Total Metals (UG/L)	
Arsenic	16.8
Iron	19,900
Manganese	210
Dissolved Metals (UG/L)	
Arsenic	11.9
Iron	14,500
Manganese	163

Station ID	CAA03-GW01
Sample ID	CAA03-GW01-1109
Sample Date	11/02/09
Organic Constituents (UG/L)	
No Exceedances	
Total Metals (UG/L)	
Arsenic	5.5
Iron	4,660
Dissolved Metals (UG/L)	
Cobalt	1.1 J

Station ID	CAA03-GW05
Sample ID	CAA03-GW05-1109
Sample Date	11/05/09
VOCs (UG/L)	
Benzene	14
Ethylbenzene	10
Xylene, total	25
SVOCs (UG/L)	
2-Methylnaphthalene	32
Benzo(a)anthracene	2.9
Benzo(a)pyrene	2
Benzo(b)fluoranthene	2.7
Benzo(k)fluoranthene	0.94
Dibenz(a,h)anthracene	0.26 J
Dibenzofuran	19
Indeno(1,2,3-cd)pyrene	1.2 J
Naphthalene	560
Total Metals (UG/L)	
Arsenic	4.8 J
Iron	39,400
Manganese	380
Mercury	2.3
Dissolved Metals (UG/L)	
Arsenic	2.5 J
Iron	28,600
Manganese	377

Screening Criteria

Contaminant of Potential Concern	CLEAN CAX BKG GW YE AQUIFER 95% UTL	CLEAN MCL-Groundwater	CLEAN RSLs Tapwater Adjusted
VOCs			
1,4-Dichlorobenzene	--	75	0.43
Benzene	--	5	0.41
Ethylbenzene	--	700	1.5
Xylene, total	--	10,000	20
SVOCs (UG/L)			
2-Methylnaphthalene	--	--	15
Benzo(a)anthracene	--	--	0.029
Benzo(a)pyrene	--	0.2	0.0029
Benzo(b)fluoranthene	--	--	0.029
Benzo(k)fluoranthene	--	--	0.29
Dibenz(a,h)anthracene	--	--	0.0029
Dibenzofuran	--	--	3.7
Indeno(1,2,3-cd)pyrene	--	--	0.029
Naphthalene	--	--	0.14
Pesticide/PCBs (UG/L)			
Dieldrin	--	--	0.0042
Total Metals (UG/L)			
Aluminum	2,230	--	3,700
Arsenic	2.28	10	0.045
Chromium	15.1	100	0.043
Iron	894	--	2,600
Manganese	57.9	--	88
Mercury	0.081	2	1.1
Vanadium	26.2	--	18
Dissolved Metals (UG/L)			
Arsenic	1.37	10	0.045
Cobalt	0.7	--	1.1
Iron	275	--	2,600
Manganese	49.5	--	88

Legend

- 2009 SI Well Point Groundwater Sample Location
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds BKG & MCL

Exceeds BKG & RSL

Exceeds BKG, MCL & RSL

N

0 40 80 Feet

Figure 5-7
AOC 3 Groundwater Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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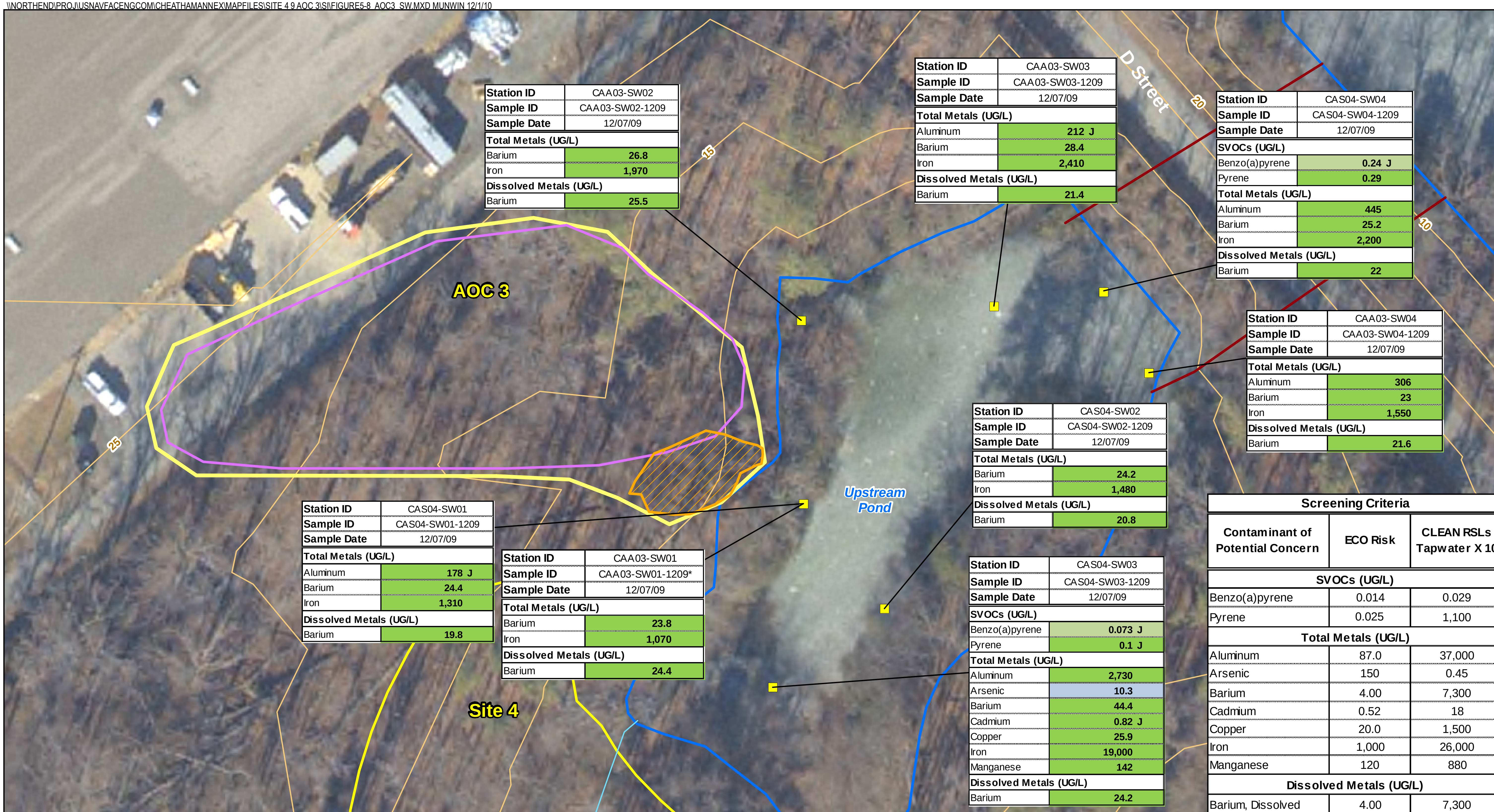
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE5-8_AOC3_SW.MXD MUNWIN 12/1/10



Station ID	CAA03-SW02
Sample ID	CAA03-SW02-1209
Sample Date	12/07/09
Total Metals (UG/L)	
Barium	26.8
Iron	1,970
Dissolved Metals (UG/L)	
Barium	25.5

Station ID	CAA03-SW03
Sample ID	CAA03-SW03-1209
Sample Date	12/07/09
Total Metals (UG/L)	
Aluminum	212 J
Barium	28.4
Iron	2,410
Dissolved Metals (UG/L)	
Barium	21.4

Station ID	CAS04-SW04
Sample ID	CAS04-SW04-1209
Sample Date	12/07/09
SVOCs (UG/L)	
Benzo(a)pyrene	0.24 J
Pyrene	0.29
Total Metals (UG/L)	
Aluminum	445
Barium	25.2
Iron	2,200
Dissolved Metals (UG/L)	
Barium	22

Station ID	CAA03-SW04
Sample ID	CAA03-SW04-1209
Sample Date	12/07/09
Total Metals (UG/L)	
Aluminum	306
Barium	23
Iron	1,550
Dissolved Metals (UG/L)	
Barium	21.6

Station ID	CAS04-SW02
Sample ID	CAS04-SW02-1209
Sample Date	12/07/09
Total Metals (UG/L)	
Barium	24.2
Iron	1,480
Dissolved Metals (UG/L)	
Barium	20.8

Station ID	CAS04-SW01
Sample ID	CAS04-SW01-1209
Sample Date	12/07/09
Total Metals (UG/L)	
Aluminum	178 J
Barium	24.4
Iron	1,310
Dissolved Metals (UG/L)	
Barium	19.8

Station ID	CAA03-SW01
Sample ID	CAA03-SW01-1209*
Sample Date	12/07/09
Total Metals (UG/L)	
Barium	23.8
Iron	1,070
Dissolved Metals (UG/L)	
Barium	24.4

Station ID	CAS04-SW03
Sample ID	CAS04-SW03-1209
Sample Date	12/07/09
SVOCs (UG/L)	
Benzo(a)pyrene	0.073 J
Pyrene	0.1 J
Total Metals (UG/L)	
Aluminum	2,730
Arsenic	10.3
Barium	44.4
Cadmium	0.82 J
Copper	25.9
Iron	19,000
Manganese	142
Dissolved Metals (UG/L)	
Barium	24.2

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Tapwater X 10
SVOCs (UG/L)		
Benzo(a)pyrene	0.014	0.029
Pyrene	0.025	1,100
Total Metals (UG/L)		
Aluminum	87.0	37,000
Arsenic	150	0.45
Barium	4.00	7,300
Cadmium	0.52	18
Copper	20.0	1,500
Iron	1,000	26,000
Manganese	120	880
Dissolved Metals (UG/L)		
Barium, Dissolved	4.00	7,300

Legend

- 2009 SI Surface Water/Sediment Sample Location
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO

Exceeds RSL

Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-8
AOC 3 Surface Water Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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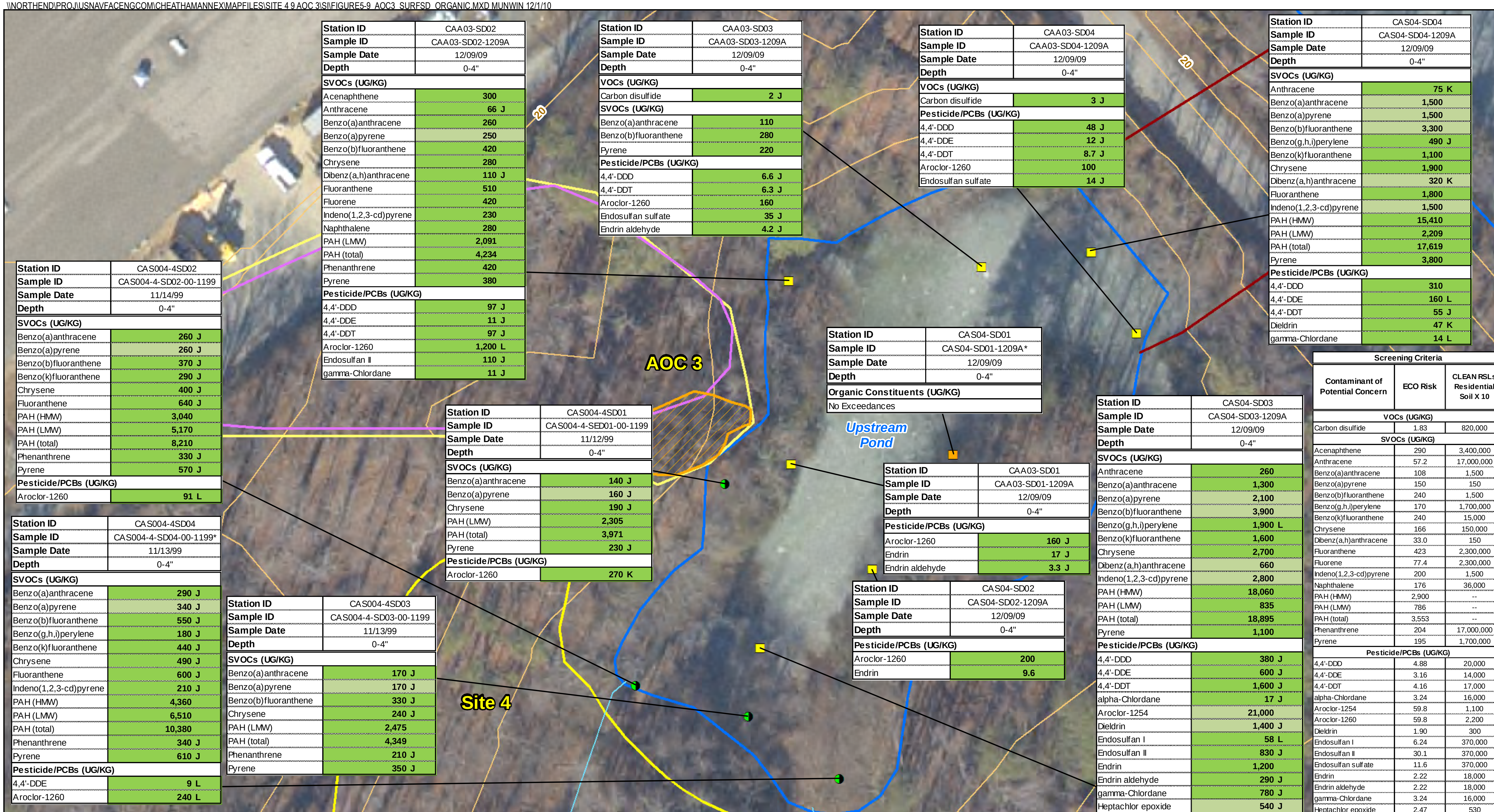
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE5-9_AOC3_SURFSD_ORGANIC.MXD MUNWIN 12/1/10



Station ID	CAA03-SD02
Sample ID	CAA03-SD02-1209A
Sample Date	12/09/09
Depth	0-4"
SVOCs (UG/KG)	
Acenaphthene	300
Anthracene	66 J
Benzo(a)anthracene	260
Benzo(a)pyrene	250
Benzo(b)fluoranthene	420
Chrysene	280
Dibenz(a,h)anthracene	110 J
Fluoranthene	510
Fluorene	420
Indeno(1,2,3-cd)pyrene	230
Naphthalene	280
PAH (LMW)	2,091
PAH (total)	4,234
Phenanthrene	420
Pyrene	380
Pesticide/PCBs (UG/KG)	
4,4'-DDD	97 J
4,4'-DDE	11 J
4,4'-DDT	97 J
Aroclor-1260	1,200 L
Endosulfan II	110 J
gamma-Chlordane	11 J

Station ID	CAA03-SD03
Sample ID	CAA03-SD03-1209A
Sample Date	12/09/09
Depth	0-4"
VOCs (UG/KG)	
Carbon disulfide	2 J
SVOCs (UG/KG)	
Benzo(a)anthracene	110
Benzo(b)fluoranthene	280
Pyrene	220
Pesticide/PCBs (UG/KG)	
4,4'-DDD	6.6 J
4,4'-DDT	6.3 J
Aroclor-1260	160
Endosulfan sulfate	35 J
Endrin aldehyde	4.2 J

Station ID	CAA03-SD04
Sample ID	CAA03-SD04-1209A
Sample Date	12/09/09
Depth	0-4"
VOCs (UG/KG)	
Carbon disulfide	3 J
Pesticide/PCBs (UG/KG)	
4,4'-DDD	48 J
4,4'-DDE	12 J
4,4'-DDT	8.7 J
Aroclor-1260	100
Endosulfan sulfate	14 J

Station ID	CAS04-SD04
Sample ID	CAS04-SD04-1209A
Sample Date	12/09/09
Depth	0-4"
SVOCs (UG/KG)	
Anthracene	75 K
Benzo(a)anthracene	1,500
Benzo(a)pyrene	1,500
Benzo(b)fluoranthene	3,300
Benzo(g,h,i)perylene	490 J
Benzo(k)fluoranthene	1,100
Chrysene	1,900
Dibenz(a,h)anthracene	320 K
Fluoranthene	1,800
Indeno(1,2,3-cd)pyrene	1,500
PAH (HMW)	15,410
PAH (LMW)	2,209
PAH (total)	17,619
Pyrene	3,800
Pesticide/PCBs (UG/KG)	
4,4'-DDD	310
4,4'-DDE	160 L
4,4'-DDT	55 J
Dieldrin	47 K
gamma-Chlordane	14 L

Station ID	CAS004-4SD02
Sample ID	CAS004-4-SD02-00-1199
Sample Date	11/14/99
Depth	0-4"
SVOCs (UG/KG)	
Benzo(a)anthracene	260 J
Benzo(a)pyrene	260 J
Benzo(b)fluoranthene	370 J
Benzo(k)fluoranthene	290 J
Chrysene	400 J
Fluoranthene	640 J
PAH (HMW)	3,040
PAH (LMW)	5,170
PAH (total)	8,210
Phenanthrene	330 J
Pyrene	570 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	91 L

Station ID	CAS04-SD01
Sample ID	CAS04-SD01-1209A*
Sample Date	12/09/09
Depth	0-4"
Organic Constituents (UG/KG)	
No Exceedances	

Station ID	CAS004-4SD01
Sample ID	CAS004-4-SED01-00-1199
Sample Date	11/12/99
Depth	0-4"
SVOCs (UG/KG)	
Benzo(a)anthracene	140 J
Benzo(a)pyrene	160 J
Chrysene	190 J
PAH (LMW)	2,305
PAH (total)	3,971
Pyrene	230 J
Pesticide/PCBs (UG/KG)	
Aroclor-1260	270 K

Station ID	CAA03-SD01
Sample ID	CAA03-SD01-1209A
Sample Date	12/09/09
Depth	0-4"
Pesticide/PCBs (UG/KG)	
Aroclor-1260	160 J
Endrin	17 J
Endrin aldehyde	3.3 J

Station ID	CAS04-SD03
Sample ID	CAS04-SD03-1209A
Sample Date	12/09/09
Depth	0-4"
SVOCs (UG/KG)	
Anthracene	260
Benzo(a)anthracene	1,300
Benzo(a)pyrene	2,100
Benzo(b)fluoranthene	3,900
Benzo(g,h,i)perylene	1,900 L
Benzo(k)fluoranthene	1,600
Chrysene	2,700
Dibenz(a,h)anthracene	660
Indeno(1,2,3-cd)pyrene	2,800
PAH (HMW)	18,060
PAH (LMW)	835
PAH (total)	18,895
Pyrene	1,100
Pesticide/PCBs (UG/KG)	
4,4'-DDD	380 J
4,4'-DDE	600 J
4,4'-DDT	1,600 J
alpha-Chlordane	17 J
Aroclor-1254	21,000
Dieldrin	1,400 J
Endosulfan I	58 L
Endosulfan II	830 J
Endrin	1,200
Endrin aldehyde	290 J
gamma-Chlordane	780 J
Heptachlor epoxide	540 J

Station ID	CAS004-4SD04
Sample ID	CAS004-4-SD04-00-1199*
Sample Date	11/13/99
Depth	0-4"
SVOCs (UG/KG)	
Benzo(a)anthracene	290 J
Benzo(a)pyrene	340 J
Benzo(b)fluoranthene	550 J
Benzo(g,h,i)perylene	180 J
Benzo(k)fluoranthene	440 J
Chrysene	490 J
Fluoranthene	600 J
Indeno(1,2,3-cd)pyrene	210 J
PAH (HMW)	4,360
PAH (LMW)	6,510
PAH (total)	10,380
Phenanthrene	340 J
Pyrene	610 J
Pesticide/PCBs (UG/KG)	
4,4'-DDE	9 L
Aroclor-1260	240 L

Station ID	CAS004-4SD03
Sample ID	CAS004-4-SD03-00-1199
Sample Date	11/13/99
Depth	0-4"
SVOCs (UG/KG)	
Benzo(a)anthracene	170 J
Benzo(a)pyrene	170 J
Benzo(b)fluoranthene	330 J
Chrysene	240 J
PAH (LMW)	2,475
PAH (total)	4,349
Phenanthrene	210 J
Pyrene	350 J

Station ID	CAS04-SD02
Sample ID	CAS04-SD02-1209A
Sample Date	12/09/09
Depth	0-4"
Pesticide/PCBs (UG/KG)	
Aroclor-1260	200
Endrin	9.6

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil X 10
VOCs (UG/KG)		
Carbon disulfide	1.83	820,000
SVOCs (UG/KG)		
Acenaphthene	290	3,400,000
Anthracene	57.2	17,000,000
Benzo(a)anthracene	108	1,500
Benzo(a)pyrene	150	150
Benzo(b)fluoranthene	240	1,500
Benzo(g,h,i)perylene	170	1,700,000
Benzo(k)fluoranthene	240	15,000
Chrysene	166	150,000
Dibenz(a,h)anthracene	33.0	150
Fluoranthene	423	2,300,000
Fluorene	77.4	2,300,000
Indeno(1,2,3-cd)pyrene	200	1,500
Naphthalene	176	36,000
PAH (HMW)	2,900	--
PAH (LMW)	786	--
PAH (total)	3,553	--
Phenanthrene	204	17,000,000
Pyrene	195	1,700,000
Pesticide/PCBs (UG/KG)		
4,4'-DDD	4.88	20,000
4,4'-DDE	3.16	14,000
4,4'-DDT	4.16	17,000
alpha-Chlordane	3.24	16,000
Aroclor-1254	59.8	1,100
Aroclor-1260	59.8	2,200
Dieldrin	1.90	300
Endosulfan I	6.24	370,000
Endosulfan II	30.1	370,000
Endosulfan sulfate	11.6	370,000
Endrin	2.22	18,000
Endrin aldehyde	2.22	18,000
gamma-Chlordane	3.24	16,000
Heptachlor epoxide	2.47	530

Legend

- 2009 SI Surface Water/Sediment Sample Location
- Sediment Sample Location
- 1999 Sediment Sample
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-9
AOC 3 Surface Sediment Organics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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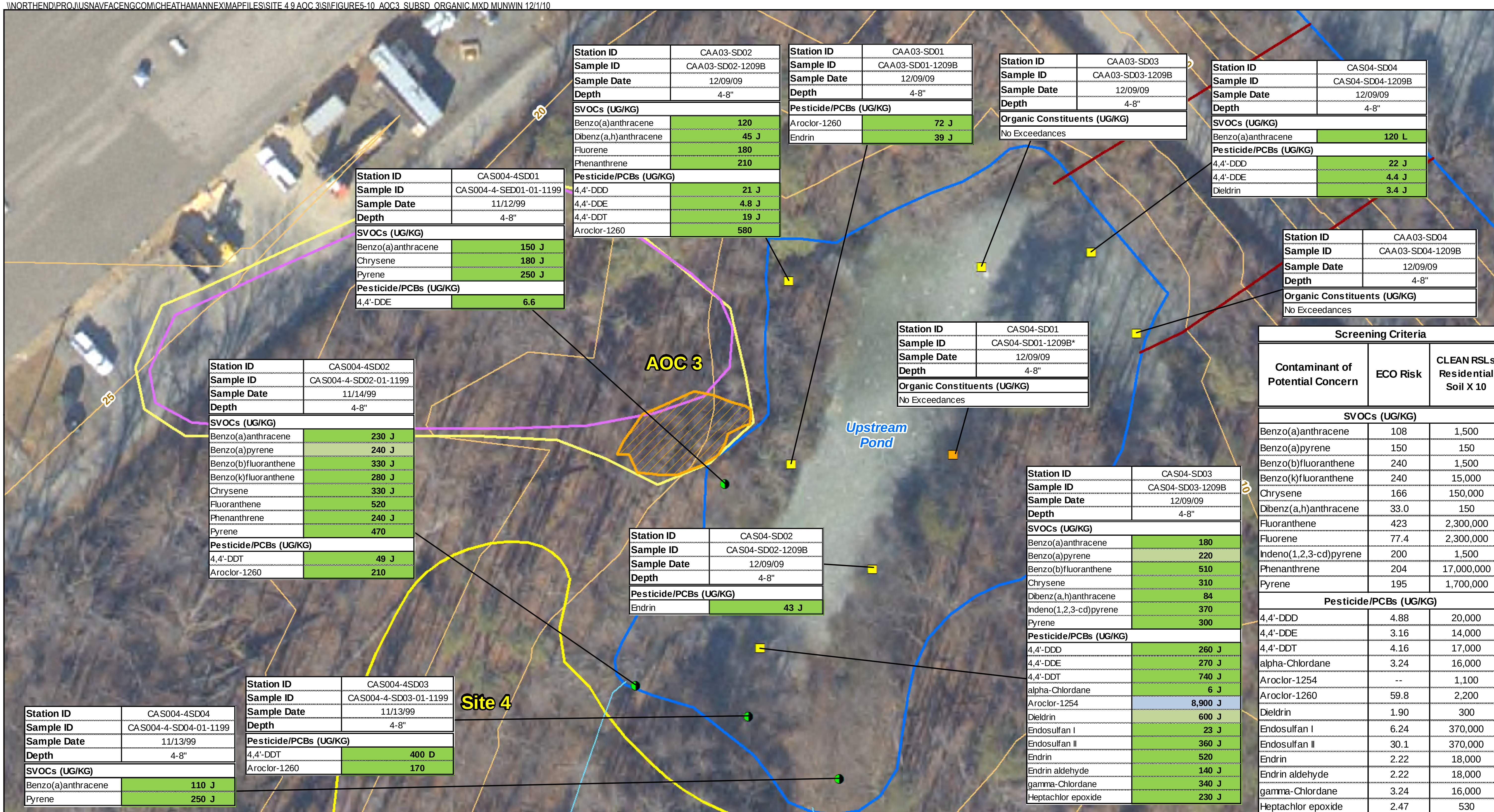
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE5-10_AOC3_SUBSD_ORGANIC.MXD MUNWIN 12/1/10



Station ID	CAA03-SD02
Sample ID	CAA03-SD02-1209B
Sample Date	12/09/09
Depth	4-8"
SVOCs (UG/KG)	
Benzo(a)anthracene	120
Dibenz(a,h)anthracene	45 J
Fluorene	180
Phenanthrene	210
Pesticide/PCBs (UG/KG)	
4,4'-DDD	21 J
4,4'-DDE	4.8 J
4,4'-DDT	19 J
Aroclor-1260	580

Station ID	CAA03-SD01
Sample ID	CAA03-SD01-1209B
Sample Date	12/09/09
Depth	4-8"
Pesticide/PCBs (UG/KG)	
Aroclor-1260	72 J
Endrin	39 J

Station ID	CAA03-SD03
Sample ID	CAA03-SD03-1209B
Sample Date	12/09/09
Depth	4-8"
Organic Constituents (UG/KG)	
No Exceedances	

Station ID	CAS04-SD04
Sample ID	CAS04-SD04-1209B
Sample Date	12/09/09
Depth	4-8"
SVOCs (UG/KG)	
Benzo(a)anthracene	120 L
Pesticide/PCBs (UG/KG)	
4,4'-DDD	22 J
4,4'-DDE	4.4 J
Dieldrin	3.4 J

Station ID	CAS004-4SD01
Sample ID	CAS004-4-SED01-01-1199
Sample Date	11/12/99
Depth	4-8"
SVOCs (UG/KG)	
Benzo(a)anthracene	150 J
Chrysene	180 J
Pyrene	250 J
Pesticide/PCBs (UG/KG)	
4,4'-DDE	6.6

Station ID	CAA03-SD04
Sample ID	CAA03-SD04-1209B
Sample Date	12/09/09
Depth	4-8"
Organic Constituents (UG/KG)	
No Exceedances	

Station ID	CAS04-SD01
Sample ID	CAS04-SD01-1209B*
Sample Date	12/09/09
Depth	4-8"
Organic Constituents (UG/KG)	
No Exceedances	

Station ID	CAS004-4SD02
Sample ID	CAS004-4-SD02-01-1199
Sample Date	11/14/99
Depth	4-8"
SVOCs (UG/KG)	
Benzo(a)anthracene	230 J
Benzo(a)pyrene	240 J
Benzo(b)fluoranthene	330 J
Benzo(k)fluoranthene	280 J
Chrysene	330 J
Fluoranthene	520
Phenanthrene	240 J
Pyrene	470
Pesticide/PCBs (UG/KG)	
4,4'-DDT	49 J
Aroclor-1260	210

Station ID	CAS04-SD03
Sample ID	CAS04-SD03-1209B
Sample Date	12/09/09
Depth	4-8"
SVOCs (UG/KG)	
Benzo(a)anthracene	180
Benzo(a)pyrene	220
Benzo(b)fluoranthene	510
Chrysene	310
Dibenz(a,h)anthracene	84
Indeno(1,2,3-cd)pyrene	370
Pyrene	300
Pesticide/PCBs (UG/KG)	
4,4'-DDD	260 J
4,4'-DDE	270 J
4,4'-DDT	740 J
alpha-Chlordane	6 J
Aroclor-1254	8,900 J
Dieldrin	600 J
Endosulfan I	23 J
Endosulfan II	360 J
Endrin	520
Endrin aldehyde	140 J
gamma-Chlordane	340 J
Heptachlor epoxide	230 J

Station ID	CAS04-SD02
Sample ID	CAS04-SD02-1209B
Sample Date	12/09/09
Depth	4-8"
Pesticide/PCBs (UG/KG)	
Endrin	43 J

Station ID	CAS004-4SD03
Sample ID	CAS004-4-SD03-01-1199
Sample Date	11/13/99
Depth	4-8"
Pesticide/PCBs (UG/KG)	
4,4'-DDT	400 D
Aroclor-1260	170

Station ID	CAS004-4SD04
Sample ID	CAS004-4-SD04-01-1199
Sample Date	11/13/99
Depth	4-8"
SVOCs (UG/KG)	
Benzo(a)anthracene	110 J
Pyrene	250 J

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil X 10
SVOCs (UG/KG)		
Benzo(a)anthracene	108	1,500
Benzo(a)pyrene	150	150
Benzo(b)fluoranthene	240	1,500
Benzo(k)fluoranthene	240	15,000
Chrysene	166	150,000
Dibenz(a,h)anthracene	33.0	150
Fluoranthene	423	2,300,000
Fluorene	77.4	2,300,000
Indeno(1,2,3-cd)pyrene	200	1,500
Phenanthrene	204	17,000,000
Pyrene	195	1,700,000
Pesticide/PCBs (UG/KG)		
4,4'-DDD	4.88	20,000
4,4'-DDE	3.16	14,000
4,4'-DDT	4.16	17,000
alpha-Chlordane	3.24	16,000
Aroclor-1254	--	1,100
Aroclor-1260	59.8	2,200
Dieldrin	1.90	300
Endosulfan I	6.24	370,000
Endosulfan II	30.1	370,000
Endrin	2.22	18,000
Endrin aldehyde	2.22	18,000
gamma-Chlordane	3.24	16,000
Heptachlor epoxide	2.47	530

Legend

- 2009 SI Surface Water/Sediment Sample Location
- Sediment Sample Location
- 1999 Sediment Sample
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-10
AOC 3 Subsurface Sediment Organics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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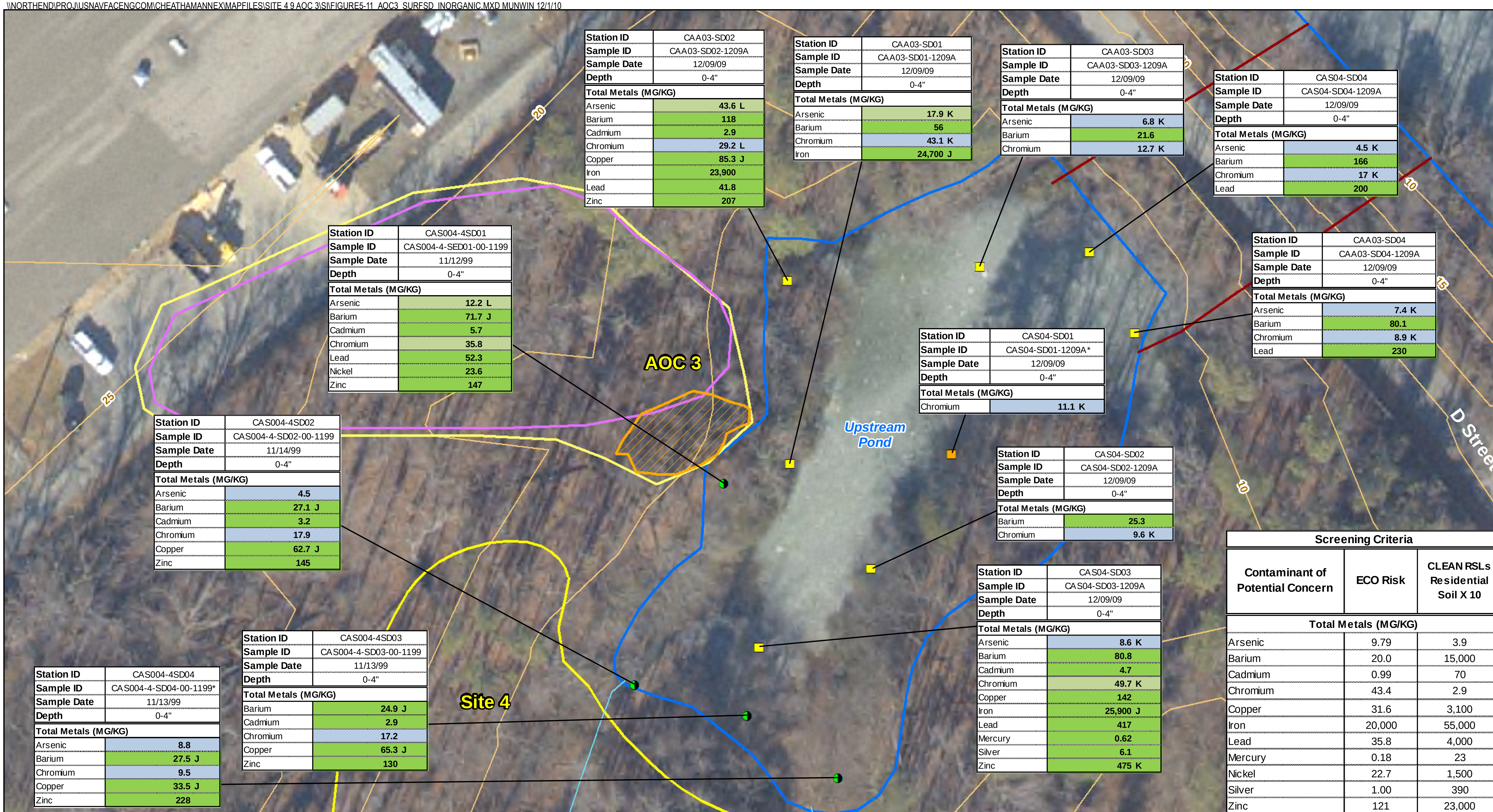
\\NORTHEND\PROJ\USNAVFACENGCOM\CHEATHAMANNEX\MAPFILES\SITE 4 9 AOC 3\SI\FIGURE5-11_AOC3_SURFSD_INORGANIC.MXD MUNWIN 12/1/10



Station ID	CAA03-SD02
Sample ID	CAA03-SD02-1209A
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	43.6 L
Barium	118
Cadmium	2.9
Chromium	29.2 L
Copper	85.3 J
Iron	23,900
Lead	41.8
Zinc	207

Station ID	CAA03-SD01
Sample ID	CAA03-SD01-1209A
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	17.9 K
Barium	56
Chromium	43.1 K
Iron	24,700 J

Station ID	CAA03-SD03
Sample ID	CAA03-SD03-1209A
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	6.8 K
Barium	21.6
Chromium	12.7 K

Station ID	CAS04-SD04
Sample ID	CAS04-SD04-1209A
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	4.5 K
Barium	166
Chromium	17 K
Lead	200

Station ID	CAS004-4SD01
Sample ID	CAS004-4-SED01-00-1199
Sample Date	11/12/99
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	12.2 L
Barium	71.7 J
Cadmium	5.7
Chromium	35.8
Lead	52.3
Nickel	23.6
Zinc	147

Station ID	CAA03-SD04
Sample ID	CAA03-SD04-1209A
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	7.4 K
Barium	80.1
Chromium	8.9 K
Lead	230

Station ID	CAS04-SD01
Sample ID	CAS04-SD01-1209A*
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Chromium	11.1 K

Station ID	CAS004-4SD02
Sample ID	CAS004-4-SD02-00-1199
Sample Date	11/14/99
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	4.5
Barium	27.1 J
Cadmium	3.2
Chromium	17.9
Copper	62.7 J
Zinc	145

Station ID	CAS04-SD02
Sample ID	CAS04-SD02-1209A
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Barium	25.3
Chromium	9.6 K

Station ID	CAS04-SD03
Sample ID	CAS04-SD03-1209A
Sample Date	12/09/09
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	8.6 K
Barium	80.8
Cadmium	4.7
Chromium	49.7 K
Copper	142
Iron	25,900 J
Lead	417
Mercury	0.62
Silver	6.1
Zinc	475 K

Station ID	CAS004-4SD03
Sample ID	CAS004-4-SD03-00-1199
Sample Date	11/13/99
Depth	0-4"
Total Metals (MG/KG)	
Barium	24.9 J
Cadmium	2.9
Chromium	17.2
Copper	65.3 J
Zinc	130

Station ID	CAS004-4SD04
Sample ID	CAS004-4-SD04-00-1199*
Sample Date	11/13/99
Depth	0-4"
Total Metals (MG/KG)	
Arsenic	8.8
Barium	27.5 J
Chromium	9.5
Copper	33.5 J
Zinc	228

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil X 10
Total Metals (MG/KG)		
Arsenic	9.79	3.9
Barium	20.0	15,000
Cadmium	0.99	70
Chromium	43.4	2.9
Copper	31.6	3,100
Iron	20,000	55,000
Lead	35.8	4,000
Mercury	0.18	23
Nickel	22.7	1,500
Silver	1.00	390
Zinc	121	23,000

Legend

- 2009 SI Surface Water/Sediment Sample Location
- Sediment Sample Location
- 1999 Sediment Sample
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-11
AOC 3 Surface Sediment Inorganics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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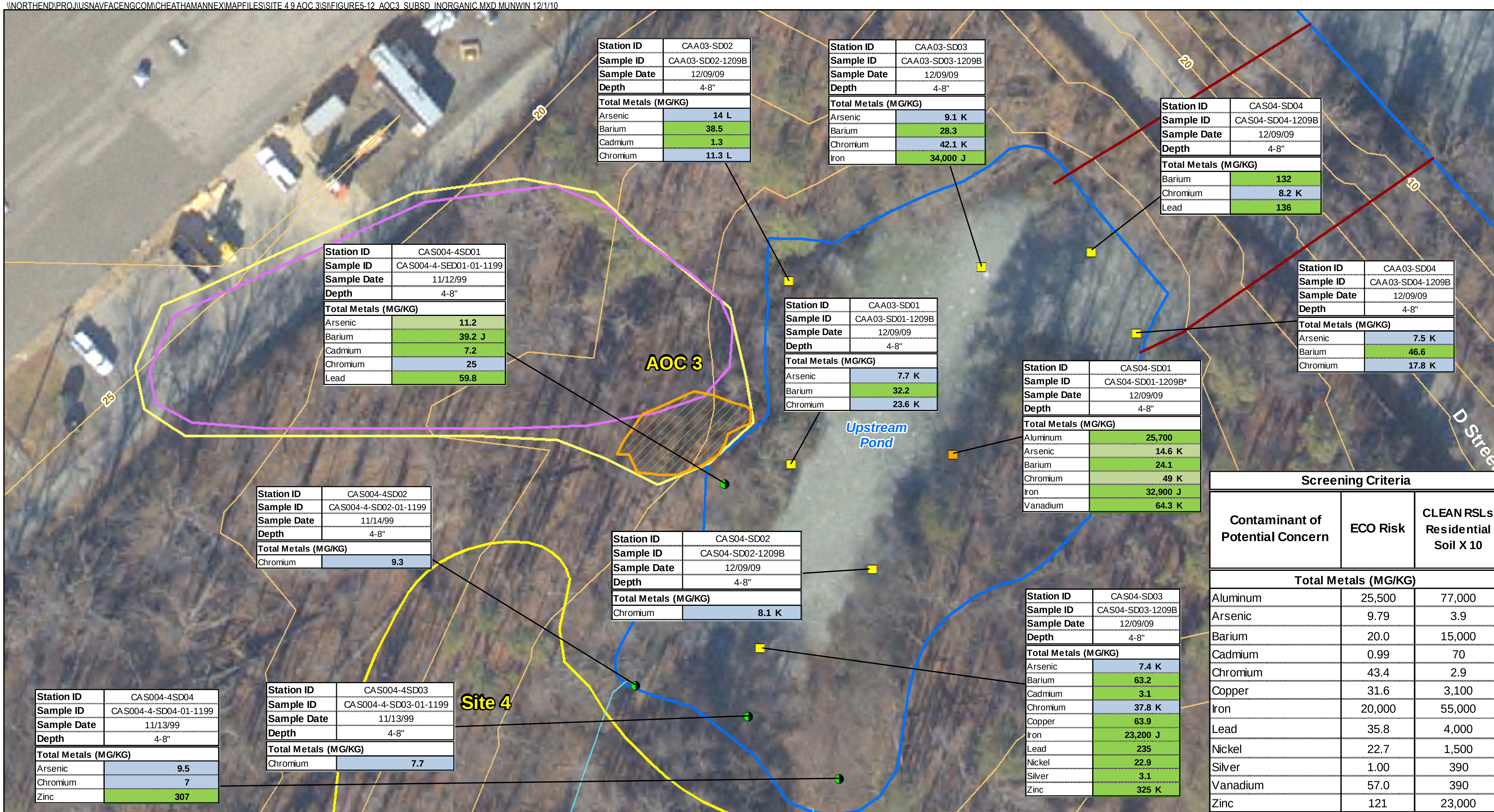

Station ID	CAA03-SD02
Sample ID	CAA03-SD02-1209B
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	14 L
Barium	38.5
Cadmium	1.3
Chromium	11.3 L

Station ID	CAA03-SD03
Sample ID	CAA03-SD03-1209B
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	9.1 K
Barium	28.3
Chromium	42.1 K
Iron	34,000 J

Station ID	CAS04-SD04
Sample ID	CAS04-SD04-1209B
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Barium	132
Chromium	8.2 K
Lead	136

Station ID	CAS004-4SD01
Sample ID	CAS004-4-SED01-01-1199
Sample Date	11/12/99
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	11.2
Barium	39.2 J
Cadmium	7.2
Chromium	25
Lead	59.8

Station ID	CAA03-SD04
Sample ID	CAA03-SD04-1209B
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	7.5 K
Barium	46.6
Chromium	17.8 K

Station ID	CAA03-SD01
Sample ID	CAA03-SD01-1209B
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	7.7 K
Barium	32.2
Chromium	23.6 K

Station ID	CAS04-SD01
Sample ID	CAS04-SD01-1209B*
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Aluminum	25,700
Arsenic	14.6 K
Barium	24.1
Chromium	49 K
Iron	32,900 J
Vanadium	64.3 K

Station ID	CAS004-4SD02
Sample ID	CAS004-4-SD02-01-1199
Sample Date	11/14/99
Depth	4-8"
Total Metals (MG/KG)	
Chromium	9.3

Station ID	CAS04-SD02
Sample ID	CAS04-SD02-1209B
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Chromium	8.1 K

Station ID	CAS04-SD03
Sample ID	CAS04-SD03-1209B
Sample Date	12/09/09
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	7.4 K
Barium	63.2
Cadmium	3.1
Chromium	37.8 K
Copper	63.9
Iron	23,200 J
Lead	235
Nickel	22.9
Silver	3.1
Zinc	325 K

Station ID	CAS004-4SD04
Sample ID	CAS004-4-SD04-01-1199
Sample Date	11/13/99
Depth	4-8"
Total Metals (MG/KG)	
Arsenic	9.5
Chromium	7
Zinc	307

Station ID	CAS004-4SD03
Sample ID	CAS004-4-SD03-01-1199
Sample Date	11/13/99
Depth	4-8"
Total Metals (MG/KG)	
Chromium	7.7

Screening Criteria

Contaminant of Potential Concern	ECO Risk	CLEAN RSLs Residential Soil X 10
Total Metals (MG/KG)		
Aluminum	25,500	77,000
Arsenic	9.79	3.9
Barium	20.0	15,000
Cadmium	0.99	70
Chromium	43.4	2.9
Copper	31.6	3,100
Iron	20,000	55,000
Lead	35.8	4,000
Nickel	22.7	1,500
Silver	1.00	390
Vanadium	57.0	390
Zinc	121	23,000

Legend

- 2009 SI Surface Water/Sediment Sample Location
- Sediment Sample Location
- 1999 Sediment Sample
- Study Area Boundary
- Drainage Channel
- Culvert
- Elevation Contour (5 ft interval)
- Water Body
- Surface Debris Pile
- Disturbed Area (1955 Aerial Photograph)

Exceeds ECO
Exceeds RSL
Exceeds ECO & RSL

* Indicates duplicate sample was collected at this location. Values presented are the higher of the two

N

0 40 80 Feet

Figure 5-12
AOC 3 Subsurface Sediment Inorganics Exceedance Results
Sites 4, 9, and AOC 3 Site Inspection
Cheatham Annex
Williamsburg, Virginia

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SECTION 6

References

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Appendix A
Human Health Risk Assessment Screening

APPENDIX A

Human Health Risk Screening (Site 4, Site 9, and AOC 3)

A conservative human health risk screening (HHRS) was performed to determine the potential for human health risks associated with exposure to site media (surface soil, subsurface soil, groundwater, surface water, and sediment,) at Site 4, Site 9, and AOC 3. The results of the human health risk screening provide a preliminary indication of potential risks from exposure to chemicals of potential concern (COPCs) identified for each site, and are used to help determine whether the sites require further evaluation (e.g., a baseline risk assessment or additional data collection) or future unrestricted (i.e., residential) use of the site is acceptable based on human health risks.

A.1 Human Health Conceptual Site Model

The human health conceptual site model (CSM) presents an overview of site conditions, potential contaminant migration pathways, and exposure pathways to potential receptors. The human health CSM for soil and groundwater for Site 4, Site 9, and AOC 3, surface water and sediment in the Upstream Pond at AOC 3, surface water and sediment in the drainage ditches at Site 4, and sediment in the drainage ditch at Site 9 is presented in **Figure A-1**. Sections 3.2.1, 4.2.1, and 5.2.1 of the SI report present the site background for Site 4, Site 9, and AOC 3, respectively. Section 1.3.2 of the SI report presents a brief overview of the land use at CAX.

CAX currently comprises 1,578 acres, of which approximately 50% is undeveloped with outdoor recreational facilities. The mission of CAX includes supplying Atlantic Fleet ships and providing recreational opportunities to military and civilian personnel. In addition to receiving, storing, issuing, packing, and shipping Navy stock material and shipboard equipment, CAX provides warehouse and distribution services for 39 Storage Authorization Programs and tenant organizations. Site 4 is situated between buildings CAD 11 and CAD 12 (see Figure 1-3 of the SI), topographically upgradient and southwest of Upstream Pond and upgradient and south of AOC 3. The area is heavily vegetated with shrubs and trees. Site 9 is approximately 900 ft east and upgradient of Cheatham Pond and approximately 2,500 ft west-southwest of the York River (see Figure 1-3 of the SI). Site 4 is approximately 1,300 ft east-northeast of Site 9. Site 9 is situated adjacent to the northwest corner of building CAD 16 and covers approximately 7,000 square feet. AOC 3 is located between Buildings CAD 11 and CAD 12, northwest and adjacent to the Upstream Pond, and northeast and adjacent to Site 4 (see Figure 1-3 of the SI). The area is heavily vegetated with shrubs and trees.

Potential current receptors at Site 4, Site 9, and AOC 3 include industrial workers from nearby buildings and trespassers. The potential current receptors may come in contact with surface soil (0 – 0.5 ft); exposure routes may include incidental ingestion of and dermal contact with the surface soil, and inhalation of volatile and particulate emissions from the surface soil. The current trespassers may also come in contact with the surface water in drainage ditches at Site 4 and the Upstream Pond and sediment in drainage ditches at Sites 4 and 9 and the Upstream Pond. Exposure routes for surface water and sediment may include incidental ingestion and dermal contact. The inhalation pathway for these two media is not considered a significant contribution to potential risks, therefore, it was not further evaluated. Because the drainage ditch at Site 9 is dry most of the year, exposure to sediment at this site was treated as if it were soil.

Potential future receptors include the current receptors, and future construction workers and hypothetical future residents. Future receptors could be exposed to surface soil and subsurface soil if future industrial facilities, piping/utilities, or residential houses are constructed at the sites. Subsurface soil was considered soil from 0.5 ft to 10 ft below ground surface, if available, which is the depth assumed to be potentially exposed during construction activities. Exposure routes for future exposure to the subsurface soil are the same as those for current surface soil, incidental ingestion of and dermal contact with the soil, and inhalation of volatile and particulate emissions from the soil.

Potable water supplies for CAX are provided by the City of Newport News Water Works. Groundwater is not used as a source of water on the base. However, a potable use scenario was evaluated in this risk assessment. It was conservatively assumed if future residential development of the site occurs; the residents could use the groundwater as a potable water supply. The residents would be exposed through ingestion, and dermal contact and inhalation while bathing. Additionally, due to the depth to groundwater (less than 10 feet below ground surface in a number of monitoring wells) at the three sites, construction workers could be exposed to the groundwater through dermal contact and inhalation of vapors in an excavation trench during construction activities.

Volatile compounds were detected in groundwater at monitoring wells at Site 4 and AOC 3; therefore, vapor intrusion into existing buildings or future buildings constructed at the sites, or nearby, was considered a potentially complete exposure pathway and was evaluated in the screening human health risk evaluation. Both current and future industrial workers and future hypothetical residents could be exposed to the groundwater through vapor intrusion from groundwater into a building and inhalation of indoor air.

A.2 Human Health Risk Screening Methodology

The human health risk screening was conducted in three steps using a risk ratio technique (U.S. Navy, 2000). If COPCs were identified after Step 1, the COPCs were evaluated in Step 2. If COPCs were identified after Step 2, the COPCs were evaluated in Step 3. The risk screening evaluation for Site 4, Site 9, and AOC 3 are presented in the Table 2 series in Attachment A.1 through A.3, respectively. The three-step screening process is described below:

A.2.1 Step 1

The maximum detected constituent concentrations for surface soil, subsurface soil, and groundwater (and Site 9 sediment, which was treated as surface soil since it is dry most of the year) were compared to the CAX/Yorktown 95% upper tolerance limit (UTL) background concentrations. Concentrations of naturally occurring constituents (metals) were compared to background UTLs. If the constituent concentration was below background, it was eliminated from further evaluation. Background data was obtained from the *Preliminary Draft Background Investigation Naval Weapons Station Yorktown and Cheatham Annex* (CH2M HILL, 2011). A brief description of the background data sets are provided in Section 1.1.1 of the SI report. There are no background data for surface water and sediment, and therefore, a comparison to background levels was not performed for these two media. If there were no background data or the constituent concentration was greater than background concentration, the site data was compared to the USEPA human health regional screening levels (RSL, USEPA 2010a), and other human health risk-based screening levels (if appropriate). RSLs based on noncarcinogenic effects were divided by 10 to account for exposure to multiple constituents (i.e., were adjusted to a hazard quotient of 0.1, from the hazard quotient of 1.0 used on the USEPA RSL table). RSLs based on carcinogenic endpoints were used as presented in the RSL table, and are based on a carcinogenic risk of 1×10^{-6}.

The surface soil, subsurface soil, and sediment data were compared to residential soil RSLs. Although industrial and construction workers are the most likely receptors at the three sites, trespassers (adult and youth) are potential receptors, in addition to hypothetical future residential receptors. Residential soil RSLs are more conservative (i.e., lower) than industrial soil RSLs, and are therefore protective of all potential receptors (e.g., trespassers, residents, industrial workers, and construction workers). If the maximum detected concentration was greater than the residential soil RSL, the constituent was carried forward to Step 2. Sediment data were compared to 10 times the residential soil RSL, following EPA Region III risk assessment practices, because exposure to sediment is expected to be significantly less than exposure to soil, and there are no screening levels for sediment. Therefore, residential soil RSLs based on noncarcinogenic effects were used as presented in the RSL table, and RSLs based on carcinogenic effects were multiplied by 10.

Soil data were also compared to the SSL for protection of groundwater. If the maximum detected concentration was greater than the SSL, a constituent was identified as a COPC. However, constituents were not carried forward to Step 2 based on exceedance of the SSL alone.

The groundwater and surface water data were compared to tap water RSLs; groundwater data were also compared to the maximum contaminant levels (MCLs) (USEPA, 2009). An exceedance of the criteria was used to identify the groundwater and surface water COPCs which were then carried forward to Step 2. Although filtered and unfiltered groundwater and surface water samples were collected, only unfiltered samples were analyzed in the risk screening evaluation. Surface water data were compared to 10 times the tap water RSL. This was done following EPA Region III risk assessment practices, because exposure to surface water is expected to be significantly less than exposure to groundwater, and there are no screening levels for surface water. RSLs based on noncarcinogenic effects were used as presented in the RSL table, and RSLs based on carcinogenic effects were multiplied by 10 to screen the surface water data.

The groundwater data were also compared to generic vapor intrusion screening levels to help identify potentially complete vapor intrusion pathways at the two sites with VOCs detected in the groundwater sites. Generic vapor instruction groundwater screening levels (GWSLs) were calculated using the methodology in Appendix D of the USEPA (2002) Vapor

Intrusion Guidance. The target groundwater concentration (i.e., GWSL) corresponding to a chemical's target indoor air concentration was calculated by dividing the target indoor air concentration (i.e., the USEPA [2010] RSLs for residential air) by the default attenuation factor (1E-03) and then converting the vapor concentration to an equivalent groundwater concentration, assuming equilibrium between the aqueous and vapor phases at the water table. The equation is as follows (USEPA, 2002):

$$C_{gw}\ [\mu g/L] = C_{target,ia}\ (\mu g/m^3\ )\ *\ 10^{-3}\ m^3/L\ *\ 1/H'_{TS}\ *1/\alpha$$

where,

Cgw	=	target groundwater concentration (i.e., GWSL),
$C_{target,ia}$	=	target indoor air concentration (i.e., RSLs for residential air),
MW	=	molecular weight (g/mole)
α	=	AF (default ratio of indoor air concentration to source vapor concentration; 1E-03), and
H'_{TS}	=	Henry's Law Constant at system (groundwater) temperature (dimensionless)

The dimensionless form of the Henry's law constant at the system temperature (i.e., at the average groundwater temperature) was estimated using the following equation:

$$H'_{TS} = \frac{\exp\left[-\frac{\Delta H_{v,TS}}{RT_s}\left(\frac{1}{T_S}-\frac{1}{T_R}\right)\right]H_R}{RT_S}$$

where,

H'_{TS}	=	Henry's law constant at the system temperature (dimensionless)
$\Delta H_{v,TS}$	=	Enthalpy of vaporization at the system temperature (cal/mol)
T_S	=	System temperature (°K)
T_R	=	Henry's law constant reference temperature (°K)
H_R	=	Henry's law constant at the reference temperature (atm-m3/mol)
R_C	=	Gas constant (= 1.9872 cal/mol - °K)
R	=	Gas constant (= 8.205 E-05 atm-m3/mol-°K)

The enthalpy of vaporization at the system temperature is calculated using the following equation:

$$\Delta H_{v,TS} = \Delta H_{v,b}\left[\frac{(1-T_S/T_C)}{(1-T_B/T_C)}\right]^n$$

where,

$\Delta H_{v,TS}$	=	Enthalpy of vaporization at the system temperature (cal/mol)
$\Delta H_{v,b}$	=	Enthalpy of vaporization at the normal boiling point (cal/mol)
T_S	=	System temperature (°K)
T_C	=	Critical temperature (°K)
T_B	=	Normal boiling point (°K)
n	=	Constant (unitless) (The value of n is a function of the ratio of T_B/T_C.)

If the maximum detected groundwater concentration was greater than the vapor intrusion GWSL, the constituent was identified as a COPC for the vapor intrusion pathway. The Step 2 and Step 3 risk ratio evaluations were not conducted for the vapor intrusion evaluation. The exceedance of vapor intrusion GWSLs is an indication that further evaluation (e.g., multiple lines of evidence investigation) may be warranted.

Lead is not evaluated in the same manner as the other COPCs, but is regulated by USEPA based on blood-lead uptake using a physiologically based pharmacokinetic model called the Integrated Exposure Uptake Biokinetic (IEUBK) Model. As a screening tool, lead is screened at 400 mg/kg in soil based on residential exposure. The model uses the average lead concentration, not the maximum detected lead concentration. If the average lead concentration is greater than 400 mg/kg, it is retained as a COPC for the AOC. For groundwater, lead is screened against the federal action level of 15 µg/L (USEPA, 2009). If the average lead concentrations are greater than the action level, it is retained as a COPC for the site/AOC.

A.2.2 Step 2

For constituents identified as COPCs in Step 1, a corresponding risk level was calculated using the following equation:

$$\text{corresponding risk level} = \frac{\text{concentration x acceptable risk level}}{\text{RSL}}$$

The concentration is the maximum detected concentration (the same concentration that was used in Step 1). The acceptable risk level is 1 for noncarcinogens and 10^{-6} for carcinogens. RSLs for noncarcinogenic effects are not adjusted by 10 as was done in Step 1; they are used as presented in the RSL table. All of the corresponding risk levels for each constituent within a media are summed to calculate the cumulative corresponding hazard index (for noncarcinogens) and cumulative corresponding carcinogenic risk (for carcinogens). A cumulative corresponding hazard index is also calculated for each target organ/effect. If the cumulative corresponding hazard index for a target organ/effect is greater than the risk-ratio screening benchmark of 0.5, or the cumulative corresponding carcinogenic risk is greater than the 5×10^{-5} risk-ratio screening benchmark, the chemicals contributing to these values are retained as COPCs and carried forward to Step 3.

A.2.3 Step 3

For constituents identified as COPCs in Step 2, a corresponding risk level was calculated as discussed above for Step 2. However, the 95 percent upper confidence limit (UCL) was used in place of the maximum detected concentration to obtain a more site-specific risk ratio. If the cumulative corresponding HI by target organ/effect is greater than the risk-ratio screening benchmark of 0.5, or the cumulative corresponding carcinogenic risk is greater than the 5×10^{-5} risk-ratio screening benchmark, then chemicals contributing to these values are considered COPCs.

Step 3 was only performed for media with COPCs from Step 2 having five or more samples. Five or more samples are needed to perform the statistical calculations necessary to estimate the Step 3 exposure concentration. The most current version of the ProUCL software program (USEPA, 2010b) was used to test the data distribution and calculate 95 percent UCL exposure point concentrations (EPC) used for the Step 3 risk ratio calculations. In cases where the recommended UCL exceeded the maximum detected concentration, the maximum concentration was used as the EPC. Step 3 of the risk screening evaluation was not performed for groundwater at Sites 4 and 9 and sediment at Site 9 because less than five samples were available for these media and a 95% UCL could not be calculated.

A.3 Human Health Risk Screening Results

The human health risk-based screening and risk ratio evaluation were performed for surface soil, subsurface soil, groundwater, and sediment for all 3 sites, and surface water for Site 4 and AOC 3.

A.3.1 Site 4 Risk Screening Results

The risk-based screening evaluation at Site 4 was conducted for surface soil, subsurface soil, groundwater, surface sediment, and subsurface sediment. The results of the risk evaluation for Site 4 are presented in Attachment A.1, Tables 2.1 through 2.7b.

A.3.1.1 Surface Soil

Tables 2.1 through 2.1b in Attachment A.1**,** present the risk-based screening evaluation for surface soil at Site 4. Five PAHs, three pesticide/PCBs, and five metals were retained for evaluation in Step 2: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, aldrin, Aroclor-1242, Aroclor-1260, aluminum, arsenic, chromium, iron, and vanadium. Based on Step 2 (risk ratio using maximum detected concentrations), the five PAHs, three pesticide/PCBs, and two of the metals (arsenic and chromium) were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), all Step 2 constituents were retained as COPCs for surface soil at Site 4. The highest concentrations of PAHs, pesticides, and PCBs were detected in samples collected in 1999. No screening criteria were available for carbazole. Therefore, potential risks could not be evaluated for this constituent.

A.3.1.2 Subsurface Soil

Tables 2.2 through 2.2b in Attachment A.1**,** present the risk-based screening evaluation for subsurface soil at Site 4. Two PAHs, one SVOC, two PCBs, and four metals were retained for evaluation in Step 2: benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate Aroclor-1242, Aroclor-1260, aluminum, arsenic, chromium, and vanadium. Based on Step 2 (risk ratio using maximum detected concentrations), the two PAHs, one SVOC, two PCBs, and two metals (arsenic and chromium) were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), all Step 2 constituents were retained as COPCs for subsurface soil at Site 4. The highest concentrations of PAHs, pesticides, and PCBs were detected in samples collected in 1999.

The potential unacceptable carcinogenic risk is primarily associated with chromium, and based on the assumption that all of the chromium present in the soil is in the hexavalent form of chromium.

A.3.1.3 Groundwater

Tables 2.3 and 2.3a in Attachment A.1, present the risk-based screening evaluation for groundwater at Site 4. One VOC and three metals were retained for evaluation in Step 2: tetrachloroethene (PCE), arsenic, iron, and manganese. Based on Step 2 (risk ratio using maximum detected concentrations), PCE and arsenic were retained as COPCs. The Step 3 (risk ratio using 95% UCLs) evaluation was not conducted because only 4 groundwater samples were collected at the site. The potential unacceptable carcinogenic risk is primarily associated with the arsenic, the PCE alone would not result in an unacceptable risk.

A.3.1.4 Indoor Air (Vapor Intrusion of Groundwater)

Table 2.4 in Attachment A.1 presents the risk-based screening evaluation for indoor at Site 4. One VOC (PCE) exceeded the vapor intrusion GWSLs and was retained as a COPC. Exceedance of the GWSLs indicates that the vapor intrusion pathway may be complete and further evaluation may be warranted.

A.3.1.5 Surface Water (Drainage Ditches)

Tables 2.5 through 2.5b in Attachment A.1, present the risk-based screening evaluation for surface water in the drainage ditches at Site 4. Two metals (arsenic and iron) were retained for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentrations), arsenic and iron were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), arsenic and iron were retained as COPCs for surface water in the ditches at Site 4.

The potential unacceptable carcinogenic risk is associated with arsenic; arsenic was only detected in one of the five surface water samples. Iron, the only contributor to the potential noncarcinogenic hazard is considered an essential human nutrient, and although the concentrations indicate a potential unacceptable hazard, it is likely that exposure to iron at the concentrations present on site would not results in any adverse health effects.

A.3.1.6 Sediment (Drainage Ditches)

Tables 2.6 through 2.6b in Attachment A.1 present the risk-based screening evaluation for surface sediment (0 – 4 inches) at Site 4. One PAH [benzo(a)pyrene) and two metals (arsenic and chromium) were retained for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentrations), benzo(a)pyrene, arsenic, and chromium were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), benzo(a)pyrene, arsenic, and chromium were retained as COPCs for surface sediment in the ditches at Site 4. The potential unacceptable carcinogenic risk is primarily associated with chromium, and based on the assumption that all of the chromium present in the surface sediment is in the hexavalent form of chromium. Benzo(a)pyrene and arsenic alone do not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$. Carbazole and thallium did not have any available screening criteria; potential risks associated with these constituents could not be evaluated.

Tables 2.7 through 2.7b in Attachment A.1 present the risk-based screening evaluation for subsurface sediment (4 – 8 inches) at Site 4. Two metals (arsenic and chromium) were retained for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentrations), arsenic and chromium were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), arsenic and iron were retained as COPCs for subsurface sediment in the ditches at Site 4. The potential unacceptable carcinogenic risk is primarily associated with chromium, and based on the assumption that all of the chromium present in the subsurface sediment is in the hexavalent form of chromium. Arsenic alone does not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$. Carbazole did not have any available screening criteria; potential risks associated with this constituent could not be evaluated.

A.3.1.7 Site 4 Risk Screening Summary

Exposure to surface soil and subsurface soil could result in potential unacceptable human health risks, associated with exposure to PAHs, SVOCs, pesticides, PCBs, and metals. Exposure to groundwater could result in potential unacceptable human health risks, associated with exposure to PCE and arsenic. Exposure to indoor air (i.e., vapor intrusion from groundwater) could result in potential unacceptable human health risks, associated with exposure to PCE. Exposure to surface water in the drainage ditches could result in potential unacceptable human health risks, associated with exposure to arsenic and iron. However, arsenic was detected in only one sample. Exposure to sediment in the drainage ditches could also result in potential unacceptable human health risks, associated with exposure to benzo(a)pyrene (surface sediment only), arsenic, and chromium.

The potential unacceptable carcinogenic risk in subsurface soil and sediment is primarily associated with chromium, which individually exceed the benchmark carcinogenic level of 5×10^{-5}. As discussed previously, it was assumed that all of the chromium present in the soil and the sediment is in the hexavalent form of chromium. It is unlikely that the chromium is present in this form, and more likely it is in a trivalent state. Chromium is generally found in natural soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, it is likely there would be no unacceptable risks associated with exposure to the subsurface soil and sediment in the drainage ditches.

The potential unacceptable noncarcinogenic risk in surface water is primarily associated with iron. Iron is an essential human nutrient and is toxic only at very high doses; however iron was handled the same way as other detected constituents in the HHRS because human health-based screening criteria are available for this constituents. Also, the iron screening criteria is based on a provisional toxicity value that increases the uncertainty associated with the screening risk evaluation.

A.3.2 Site 9 Risk Screening Results

The risk-based screening evaluation at Site 9 was conducted for surface soil, subsurface soil, groundwater, surface sediment, and subsurface sediment. The results of the risk evaluation for Site 9 are presented in Attachment A.2, Tables 2.1 through 2.5a.

A.3.2.1 Surface Soil

Tables 2.1 through 2.1b in Attachment A.2 present the risk-based screening evaluation for surface soil at Site 9. One PAH [benzo(a)pyrene], one PCB (Aroclor-1260), and three metals (aluminum, chromium, and copper) were retained for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentrations), the one PAH [benzo(a)pyrene], one PCB (Aroclor-1260),and one metal (chromium) were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), all Step 2 constituents were retained as COPCs for surface soil at Site 9. No screening criteria were available for carbazole. Therefore, potential risks could not be evaluated for this constituent.

The potential unacceptable carcinogenic risk is primarily associated with chromium, and based on the assumption that all of the chromium present in the soil is in the hexavalent form of chromium. Benzo(a)pyrene and Aroclor-1260 alone do not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$. Chromium is generally found in natural soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, it is likely there would be no unacceptable risks associated with exposure to surface soil.

A.3.2.2 Subsurface Soil

Tables 2.2 through 2.2b in Attachment A.2 present the risk-based screening evaluation for subsurface soil at Site 9. Four metals (aluminum, arsenic, chromium, and vanadium) were retained for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentrations), arsenic and chromium were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), both arsenic and chromium were retained as a COPC for subsurface soil at Site 9. No screening criteria were available for carbazole; potential risks could not be evaluated for this constituent.

The carcinogenic risk associated with subsurface soil is primarily associated with chromium. Arsenic alone does not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$. For the risk evaluation, it is assumed that all of the chromium present in the subsurface soil is in the hexavalent form. It is unlikely that all of the chromium is present in this form, and more likely it is in a trivalent state. Chromium is generally found in natural soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, it is likely there would be no unacceptable risks associated with exposure to subsurface soil.

A.3.2.3 Sediment

Sediment at Site 9 is dry most of the year, therefore it was evaluated as if it was soil and was screened against the screening criteria established for soil. Attachment A.2, Tables 2.3 and 2.3a present the risk-based screening evaluation for surface sediment (0 – 4 inches) at the Site 9. Five PAHs, one PCB, one pesticide, and five metals were retained for evaluation in Step 2: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1260, dieldrin, aluminum, arsenic, chromium, iron, and vanadium. Based on Step 2 (risk ratio using maximum detected concentrations), five PAHs, one PCB, one pesticide, and two metals were identified as COPCs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1260, dieldrin, arsenic, and chromium. The Step 3 (risk ratio using 95% UCLs) evaluation was not conducted because only 3 surface sediment samples were collected at the site.

Attachment A.2, Tables 2.4 and 2.4a present the risk-based screening evaluation for subsurface sediment (4 – 8 inches) at the Site 9. One PCB and five metals were retained for evaluation in Step 2: Aroclor-1260, aluminum, arsenic, chromium, iron, and vanadium. Based on Step 2 (risk ratio using maximum detected concentrations), one PCB (Aroclor-1260), three metals (arsenic, chromium, and iron) were identified as COPCs. The Step 3 (risk ratio using 95% UCLs) evaluation was not conducted because only 3 surface sediment samples were collected at the site. Screening criteria was not available for thallium. Therefore, potential risks could not be evaluated for this constituent.

Aroclor-1260, arsenic, and chromium contribute to carcinogenic risk in subsurface sediment. Aroclor-1260 and arsenic alone do not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$. The potential unacceptable carcinogenic risk is primarily associated with chromium which is assumed to be in the hexavalent form of chromium, which is unlikely. Iron, the only contributor to the potential noncariconogenic hazard is considered an essential human nutrient, and although the concentrations indicate a potential unacceptable hazard, it is likely that exposure to iron at the concentrations present on site would not results in any adverse health effects.

A.3.2.4 Groundwater

Tables 2.5 and 2.5a in Attachment A.2**,** present the risk-based screening evaluation for groundwater at Site 9. Two PAHs [benzo(a)anthracene and benzo(a)pyrene] and two metals (iron and manganese) were retained for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentrations), no COPCs were retained. Therefore, exposure to groundwater at Site 9 would not be expected to result in any unacceptable human health risks based on potential human exposure.

A.3.2.5 Site 9 Risk Screening Summary

Based on the HHRS evaluation, potential unacceptable risks were identified for surface soil, subsurface soil, surface sediment, and subsurface sediment. The carcinogenic risk associated with surface soil, subsurface soil, and subsurface sediment is primarily associated with chromium. As discussed above, this is based on the assumption that all of the chromium present is in the hexavalent form. It is unlikely that the chromium is present in this form, and more likely it is in a trivalent state. Chromium is generally found in nature in soil in the trivalent form, unless activities at the site have resulted in the release or formation of hexavalent chromium. Therefore, it is likely there would be no unacceptable risks associated with exposure to subsurface soil and subsurface sediment. For surface sediment, the potential unacceptable cancer risks are associated with a number of PAHs, pesticide/PCBs, and metals.

Potentially unacceptable noncarcinogenic hazards were identified for subsurface sediment. The hazard associated with the subsurface sediment is primarily associated with iron, an essential human nutrient.

A.3.3 AOC 3 Risk Screening Results

The risk-based screening evaluation at AOC 3 was conducted for surface soil, subsurface soil, groundwater, and indoor air (i.e., vapor intrusion from groundwater). The results of the risk evaluation for AOC 3 are presented in Attachment A.3, Tables 2.1 through 2.4a.

Surface water and sediment samples were also collected from Upstream Pond. The results of the risk evaluation for Upstream Pond were discussed in Section A.3.2 and presented in Attachment A.3, Tables 2.5 through 2.7b.

A.3.3.1 Surface Soil

Tables 2.1 through 2.1b in Attachment A.3 present the risk-based screening evaluation for surface soil at AOC 3. Ten PAHs, one SVOC, two pesticides, and five metals were retained for evaluation in Step 2: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, pyrene, dibenzofuran, dieldrin, gamma-BHC, aluminum, arsenic, chromium, iron, and lead. Based on Step 2 (risk ratio using maximum detected concentrations), eight PAHs, two pesticides, and three metals were carried forward to Step 3: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, gamma-BHC arsenic, chromium, and iron. Based on Step 3 (risk ratio using 95% UCLs), the eight PAHs, dieldrin, gamma-BHC, arsenic, and chromium were retained as COPCs for surface soil at AOC 3. Screening criteria were not available for carbazole and thallium. Therefore, potential risks could not be evaluated for these constituents.

The average lead concentration in the AOC 3 surface soil is 97 mg/kg, which is less than the lead screening level. Therefore, lead is not considered to be present at a concentration of potential concern, and lead was eliminated as a COPC in the AOC 3 surface soil.

A.3.3.2 Subsurface Soil

Tables 2.2 through 2.2b in Attachment A.3 present the risk-based screening evaluation for subsurface soil at AOC 3. Six PAHs, one pesticide, and six metals were retained for evaluation in Step 2: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, aluminum, arsenic, chromium, cobalt, manganese, and vanadium. Based on Step 2 (risk ratio using maximum detected concentrations), the six PAHs, dieldrin, and four of the metals (aluminum, arsenic, chromium, and manganese) were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), the six PAHs, dieldrin, and two metals (arsenic and chromium) were retained as COPCs for subsurface soil at AOC 3 Screening criteria were not available for methylcyclohexane and carbazole. Therefore, potential risks could not be evaluated for these constituents.

PAHs, arsenic, and chromium contribute to carcinogenic risk. The potential unacceptable carcinogenic risk is primarily associated with chromium which is assumed to be in the hexavalent form of chromium, which is unlikely. However, PAHs and arsenic also pose a potential unacceptable cumulative risk above the acceptable level of $5x10^{-5}$.

A.3.3.3 Groundwater

Tables 2.3 through 2.3b in Attachment A.3 present the risk-based screening evaluation for groundwater at AOC 3. Five VOCs, eight PAHs, one SVOC, one pesticide, seven metals were retained for evaluation in Step 2: 1,4-dichlorobenzene, benzene, ethylbenzene, m,p-xylene, xylene (total), 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dibenzofuran, dieldrin, aluminum, arsenic, chromium, iron, manganese, mercury, and vanadium. Based on Step 2 (risk ratio using maximum detected concentrations), three VOCs, seven PAHs, one pesticide, and five metals were carried forward to Step 3: 1,4-dichlorobenzene, benzene, ethylbenzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, dieldrin, aluminum, arsenic, chromium, iron, and manganese. Based on Step 3 (risk ratio using 95% UCLs), the three VOCs, seven PAHs, one pesticide, and five metals were retained as COPCs. Screening criteria were not available for methylcyclohexane and carbazole. Therefore, potential risks could not be evaluated for these constituents.

A.3.3.4 Indoor Air (Vapor Intrusion of Groundwater)

Table 2.4 in Attachment A.3 presents the risk-based screening evaluation for indoor at AOC 3. Three VOCs exceeded the vapor intrusion GWSLs and were retained as COPCs. Exceedance of the GWSLs indicates that the vapor intrusion pathway may be complete and further evaluation is warranted.

Screening criteria were not available for the following constituents: cyclohexane, methylcyclohexane, 1,1-biphenyl, 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzaldehyde, dibenzofuran, fluorene, phenanthrene, and pyrene. Therefore, potential risks could not be evaluated for these constituents.

A.3.4 Upstream Pond (Site 4 and AOC 3) Risk Screening Results

The sediment and surface water collected from the Upstream Pond are associated with both Site 4 and AOC 3. Results of the risk evaluation for the Upstream Pond are presented Attachment A.3, Tables 2.5 through 2.7b.

A.3.4.1 Surface Water

Tables 2.5 through 2.5b in Attachment A.1**,** present the risk-based screening evaluation for surface water in Upstream Pond. One PAH [benzo(a)pyrene] and one metal (arsenic) were retained for evaluation in Step 2. Based on Step 2 (risk ratio using maximum detected concentrations), benzo(a)pyrene and arsenic were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs), benzo(a)pyrene and arsenic were retained as COPCs for surface water in Upstream Pond.

The potential unacceptable carcinogenic risk is primarily associated with arsenic; arsenic was only detected in one of the eight surface water samples. Benzo(a)pyrene alone does not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$.

A.3.4.2 Sediment

Tables 2.6 through 2.6b in Attachment A.1 present the risk-based screening evaluation for surface sediment (0 – 4 inches) in Upstream Pond adjacent to Site 4 and AOC 3. Four PAHs, one PCB, two pesticides, and two metals were retained for evaluation in Step 2: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, Aroclor-1254, dieldrin, heptachlor epoxide, arsenic, and chromium. Based on Step 2 (risk ratio using maximum detected concentrations), the four PAHs, one pesticide, two PCBs, and two metals were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs, the four PAHs, one pesticide, two PCBs, and two metals were retained as COPCs for surface sediment in Upstream Pond. Methylcyclohexane, carbazole, and thallium did not have any available screening criteria; potential risks associated with these constituents could not be evaluated.

Tables 2.7 through 2.7b in Attachment A.1 present the risk-based screening evaluation for subsurface sediment (4 – 8 inches) in Upstream Pond, adjacent to Site 4 and AOC 3. One PAH, one pesticide, one PCB, and two metals were retained for evaluation in Step 2: benzo(a)pyrene, Aroclor-1254, dieldrin, arsenic, and chromium. Based on Step 2 (risk ratio using maximum detected concentrations), the PAH, pesticide, PCB, and two metals were carried forward to Step 3. Based on Step 3 (risk ratio using 95% UCLs, the PAH, pesticide, PCB, and two metals were retained as COPCs for subsurface sediment in the Upstream Pond. Methylcyclohexane and thallium did not have any available screening criteria; potential risks associated with these constituents could not be evaluated.

A.3.4.3 Upstream Pond (Site 4 and AOC 3) Risk Screening Summary

Exposure to surface water in the Upstream Pond could result in potential unacceptable human health risks, associated with exposure to benzo(a)pyrene and arsenic. The potential unacceptable carcinogenic risk is primarily associated with arsenic; arsenic was only detected in one of the eight surface water samples. Benzo(a)pyrene alone does not pose a potential unacceptable risk above the acceptable level of $5x10^{-5}$.

Exposure to surface and subsurface sediment in the Upstream Pond could also result in potential unacceptable human health risks, associated with exposure to PAHs, pesticide/PCBs, and metals.

A.3.4.4 AOC 3 Risk Screening Summary

Exposure to surface soil, subsurface soil, and groundwater may result in an unacceptable risk to potential human receptors. Potential risks to surface soil are associated with PAHs, pesticides, and metals; potential risks to subsurface soil are associated with PAHs, a pesticide, and metals; and potential risks to groundwater are associated with VOCs, PAHs, a pesticide, and metals. Also, exceedance of the GWSLs by several VOCs indicates that the vapor intrusion pathway may be complete and further evaluation is warranted.

A.4 Human Health Risk Screening Conclusion

At Site 4, exposure to surface soil (PAHs, pesticides, PCBs, and metals), subsurface soil (PAHs, SVOC, pesticides, PCBs, and metals), groundwater (PCE and arsenic), indoor air (PCE; vapor intrusion from groundwater), drainage ditch surface water (metals), drainage ditch surface sediment (PAHs and metals), and drainage ditch subsurface sediment (metals) at Site 4 could potentially result in unacceptable risks. The carcinogenic risks estimated for the subsurface soil and sediment are primarily associated with chromium. As discussed above, this is based on the assumption that all of the chromium present is in the hexavalent form. It is unlikely that the chromium is present in the soil and sediment in this form, and more likely it is in a trivalent state. Therefore, it is likely there would be no unacceptable risks associated with exposure to subsurface soil and surface or subsurface sediment. The noncarcinogenic risk estimated for surface water is primarily associated with iron, an essential human nutrient.

At the Upstream Pond adjacent to Site 4 and AOC 3, exposures to surface water (PAHs and metals), and surface and subsurface sediment (PAHs, pesticides, PCBs, and metals) could potentially result in unacceptable risks.

At Site 9, exposure to groundwater would not result in any unacceptable risks to human health. However, exposure to surface soil (chromium), subsurface soil (chromium), drainage ditch surface sediment (PAHs, pesticides/PCBs, and metals), and drainage ditch subsurface sediment (chromium) could potentially result in unacceptable risks. The carcinogenic risks associated with surface soil, subsurface soil, and subsurface sediment are primarily associated with chromium. As discussed above, this is based on the assumption that all of the chromium present is in the hexavalent form. It is unlikely that the chromium is present in this form, and more likely it is in a trivalent state. Therefore, it is likely there would be no unacceptable risks associated with exposure to surface soil, subsurface soil, or subsurface sediment. Potentially unacceptable noncarcinogenic hazards associated with the subsurface sediment were primarily associated with iron, an essential human nutrient.

At AOC 3, exposures to surface soil (PAHs, pesticides, and metals), subsurface soil (PAHs, pesticides, and metals), groundwater (VOCs, PAHs, pesticides, and metals), and indoor air (VOCs) could potentially result in unacceptable risks. For subsurface soil, the carcinogenic risk is primarily associated with chromium. As discussed above, this is based on the assumption that all of the chromium present in the soil is in the hexavalent form. It is unlikely that the chromium is present in this form, and more likely it is in a trivalent state. Therefore, it is likely there would be no unacceptable risks associated with exposure to subsurface soil.

It should be noted that the groundwater is not currently used as a potable water supply at the site or the base, and is extremely unlikely that is ever would be used as a potable water supply.

A.5 References

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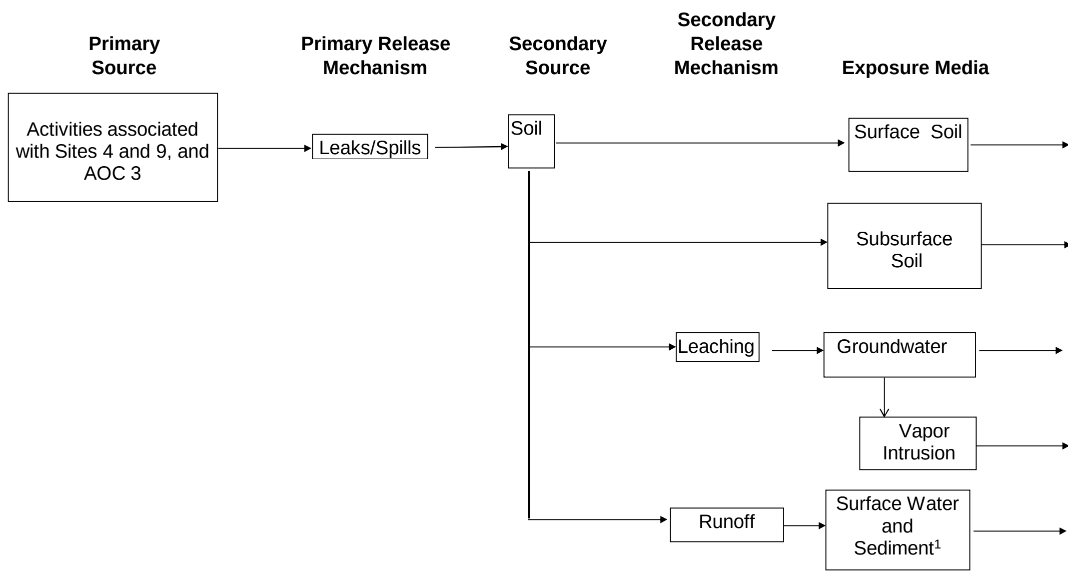

Potential Human Receptors

Exposure Route	Current/Future: Trespassers	Current/Future: Industrial Worker	Future: Residents	Future: Construction Worker
Ingestion	X	X	X	X
Dermal Contact	X	X	X	X
Inhalation	X	X	X	X
Ingestion	X	X	X	X
Dermal Contact	X	X	X	X
Inhalation	X	X	X	X
Ingestion	NA	NA	X	NA
Dermal Contact	NA	NA	X	X
Inhalation	NA	NA	X	X
Inhalation (Indoor Air)	NA	X	X	NA
Ingestion	X	NA	NA	NA
Dermal Contact	X	NA	NA	NA
Inhalation	NA	NA	NA	NA

[1] For trespasser, current exposure to surface sediment and future exposure to subsurface sediment. Sediment is present at Site 4, Site 9, and the Upstream Pond adjacent to Site 4 and AOC 3. Surface water is present at Site 4 and the Upstream Pond.

NA - Not Applicable or pathway is incomplete

X - Potentially complete exposure pathways

FIGURE A-1

Conceptual Site Model for HHRA

Site 4, Site 9, and AOC 3

Cheatham Annex, Williamsburg, Virginia

Attachments A.1 through A.3
Human Health Risk Screening Tables

Attachment A.1
Site 4

Table 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Surface Soil	67-64-1	Acetone	9.4E-02 J	1.2E-01 J	MG/KG	CAS04-SS05-1109	3/9	0.01124 - 0.031	1.2E-01	N/A	N/A	6.1E+03 N	NO	4.5E+00	NO	BSL
Site 4	100-42-5	Styrene	2.0E-03 J	2.0E-03 J	MG/KG	CAS04-SS02-1109, CAS04-SS03-1109	2/9	0.005 - 0.01479	2.0E-03	N/A	N/A	6.3E+02 NS	NO	1.8E+00	NO	BSL
	108-88-3	Toluene	2.0E-03 J	2.0E-03 J	MG/KG	CAS04-SS04-1109	1/9	0.005 - 0.01479	2.0E-03	N/A	N/A	5.0E+02 NS	NO	1.6E+00	NO	BSL
	1330-20-7	Xylene, total	2.0E-03 J	2.0E-03 J	MG/KG	CAS004-4HA02-00-1199	1/9	0.01124 - 0.018	2.0E-03	N/A	N/A	6.3E+01 NS	NO	2.0E-01	NO	BSL
	83-32-9	Acenaphthene	3.3E-01 J	3.3E-01 J	MG/KG	CAS004-4HA02-00-1199	1/10	0.021 - 5.5	3.3E-01	N/A	N/A	3.4E+02 N	NO	2.2E+01	NO	BSL
	120-12-7	Anthracene	1.7E-03 J	5.3E-01 J	MG/KG	CAS004-4HA02-00-1199	6/10	0.021 - 5.5	5.3E-01	N/A	N/A	1.7E+03 N	NO	3.6E+02	NO	BSL
	56-55-3	**Benzo(a)anthracene**	**1.0E-02 J**	**1.1E+00 J**	**MG/KG**	**CAS004-4HA02-00-1199, CAS004-4HA05-00-1199**	**7/10**	**0.021 - 6.1**	**1.1E+00**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**1.0E-02**	**YES**	**ASL-RSL, ASL-SSL**
	50-32-8	**Benzo(a)pyrene**	**4.4E-03 J**	**2.3E+00 J**	**MG/KG**	**CAS004-4HA05-00-1199**	**7/10**	**0.021 - 6.1**	**2.3E+00**	**N/A**	**N/A**	**1.5E-02 C**	**YES**	**3.5E-03**	**YES**	**ASL-RSL, ASL-SSL**
	205-99-2	**Benzo(b)fluoranthene**	**1.0E-02 J**	**1.7E+00 J**	**MG/KG**	**CAS004-4HA05-00-1199**	**9/10**	**0.021 - 6.1**	**1.7E+00**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**3.5E-02**	**YES**	**ASL-RSL, ASL-SSL**
	191-24-2	Benzo(g,h,i)perylene	2.5E-03 L	1.2E+00 J	MG/KG	CAS004-4HA05-00-1199	4/10	0.021 - 6.1	1.2E+00	N/A	N/A	1.7E+02 N	NO	1.2E+02	NO	BSL
	207-08-9	**Benzo(k)fluoranthene**	**3.7E-03 J**	**1.7E+00 J**	**MG/KG**	**CAS004-4HA05-00-1199**	**7/10**	**0.021 - 6.1**	**1.7E+00**	**N/A**	**N/A**	**1.5E+00 C**	**YES**	**3.5E-01**	**YES**	**ASL-RSL, ASL-SSL**
	117-81-7	bis(2-Ethylhexyl)phthalate	6.6E-02 J	6.6E-02 J	MG/KG	CAS04-SS05-1109	1/10	0.049 - 5.5	6.6E-02	N/A	N/A	3.5E+01 C*	NO	1.1E+00	NO	BSL
	86-74-8	Carbazole	2.1E-03 J	2.5E-01 J	MG/KG	CAS004-4HA02-00-1199	5/10	0.021 - 5.5	2.5E-01	N/A	N/A	N/A	N/A	N/A	N/A	NTX
	218-01-9	Chrysene	4.0E-03 J	2.2E+00 J	MG/KG	CAS004-4HA05-00-1199	7/10	0.021 - 6.1	2.2E+00	N/A	N/A	1.5E+01 C	NO	1.1E+00	YES	ASL-SSL
	53-70-3	Dibenz(a,h)anthracene	1.0E-02 J	1.3E-02 J	MG/KG	CAS04-SS02-1109	2/10	0.021 - 5.5	1.3E-02	N/A	N/A	1.5E-02 C	NO	1.1E-02	YES	ASL-SSL
	206-44-0	Fluoranthene	1.4E-02 J	2.7E+00	MG/KG	CAS004-4HA02-00-1199	9/10	0.021 - 6.1	2.7E+00	N/A	N/A	2.3E+02 N	NO	1.6E+02	NO	BSL
	86-73-7	Fluorene	2.5E-01 J	2.5E-01 J	MG/KG	CAS004-4HA02-00-1199	1/10	0.021 - 5.5	2.5E-01	N/A	N/A	2.3E+02 N	NO	2.7E+01	NO	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	**9.8E-03 K**	**1.3E+00 J**	**MG/KG**	**CAS004-4HA05-00-1199**	**7/10**	**0.021 - 6.1**	**1.3E+00**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**1.2E-01**	**YES**	**ASL-RSL, ASL-SSL**
	85-01-8	Phenanthrene	7.7E-03 J	2.4E+00	MG/KG	CAS004-4HA02-00-1199	7/10	0.021 - 6.1	2.4E+00	N/A	N/A	1.7E+03 N	NO	3.6E+02	NO	BSL
	129-00-0	Pyrene	6.9E-03 J	3.0E+00 J	MG/KG	CAS004-4HA05-00-1199	9/10	0.021 - 6.1	3.0E+00	N/A	N/A	1.7E+02 N	NO	1.2E+02	NO	BSL
	72-55-9	4,4'-DDE	9.0E-04 L	4.3E-02 J	MG/KG	CAS004-4HA04-00-1199	4/10	0.0035 - 0.027	4.3E-02	N/A	YES	1.4E+00 C	NO	4.7E-02	NO	BSL
	50-29-3	4,4'-DDT	1.7E-03 J	2.2E-01 K	MG/KG	CAS004-4HA05-00-1199	4/10	0.0035 - 0.028	2.2E-01	N/A	YES	1.7E+00 C*	NO	6.7E-02	YES	ASL-SSL
	309-00-2	**Aldrin**	**3.3E-02 K**	**3.3E-02 K**	**MG/KG**	**CAS004-4HA05-00-1199**	**1/10**	**0.0018 - 0.014**	**3.3E-02**	**N/A**	**YES**	**2.9E-02 C***	**YES**	**6.5E-04**	**YES**	**ASL-RSL, ASL-SSL**
	5103-71-9	alpha-Chlordane	5.4E-04 J	5.4E-04 J	MG/KG	CAS04-SS04-1109	1/10	0.0018 - 0.014	5.4E-04	2.0E-03	NO	1.6E+00 C*	N/A	1.3E-02	N/A	BBK
	53469-21-9	**Aroclor-1242**	**1.0E+00 K**	**1.0E+00 K**	**MG/KG**	**CAS004-4HA05-00-1199**	**1/10**	**0.019 - 0.28**	**1.0E+00**	**N/A**	**YES**	**2.2E-01 C**	**YES**	**5.3E-03**	**YES**	**ASL-RSL, ASL-SSL**
	11096-82-5	**Aroclor-1260**	**1.9E-02 J**	**2.7E+00 K**	**MG/KG**	**CAS004-4HA05-00-1199**	**8/10**	**0.019 - 0.28**	**2.7E+00**	**N/A**	**YES**	**2.2E-01 C**	**YES**	**2.4E-02**	**YES**	**ASL-RSL, ASL-SSL**
	33213-65-9	Endosulfan II	4.4E-03 J	5.7E-03 J	MG/KG	CAS004-4HA03-00-1199	2/10	0.0035 - 0.027	5.7E-03	N/A	YES	3.7E+01 N	NO	3.0E+00	NO	BSL
	72-20-8	Endrin	3.5E-03 J	2.8E-02 K	MG/KG	CAS004-4HA05-00-1199	3/10	0.0035 - 0.028	2.8E-02	N/A	YES	1.8E+00 N	NO	4.4E-01	NO	BSL
	7421-93-4	Endrin aldehyde	1.0E-03 J	7.7E-02 K	MG/KG	CAS004-4HA05-00-1199	4/10	0.0035 - 0.028	7.7E-02	N/A	YES	1.8E+00 N	NO	4.4E-01	NO	BSL
	53494-70-5	Endrin ketone	4.5E-03	8.7E-02 K	MG/KG	CAS004-4HA05-00-1199	2/10	0.0035 - 0.028	8.7E-02	N/A	YES	1.8E+00 N	NO	4.4E-01	NO	BSL
	5103-74-2	gamma-Chlordane	1.5E-02 K	1.5E-02 K	MG/KG	CAS004-4HA05-00-1199	1/10	0.0018 - 0.014	1.5E-02	N/A	YES	1.6E+00 C*	NO	1.3E-02	YES	ASL-SSL
	7429-90-5	**Aluminum**	**4.6E+03 L**	**2.9E+04**	**MG/KG**	**CAS04-SS02-1109**	**10/10**	**23 - 60.1**	**2.9E+04**	**1.2E+04**	**YES**	**7.7E+03 N**	**YES**	**5.5E+04**	**NO**	**ASL-RSL**
	7440-36-0	Antimony	8.0E-02 L	6.7E-01 J	MG/KG	CAS004-4HA04-00-1199	6/10	0.077 - 18	6.7E-01	1.1E+01	NO	3.1E+00 N	N/A	6.6E-01	N/A	BBK
	7440-38-2	**Arsenic**	**1.1E+00**	**6.4E+00**	**MG/KG**	**CAS04-SS02-1109**	**10/10**	**0.38 - 3**	**6.4E+00**	**6.4E+00**	**YES**	**3.9E-01 C***	**YES**	**1.3E-03**	**YES**	**ASL-RSL, ASL-SSL**
	7440-39-3	Barium	1.5E+01	1.6E+02	MG/KG	CAS004-4HA04-00-1199	10/10	0.38 - 60.1	1.6E+02	5.3E+01	YES	1.5E+03 N	NO	3.0E+02	NO	BSL
	7440-41-7	Beryllium	2.2E-01 J	7.6E-01	MG/KG	CAS04-SS02-1109	5/10	0.38 - 1.5	7.6E-01	5.9E-01	YES	1.6E+01 N	NO	5.8E+01	NO	BSL
	7440-43-9	Cadmium	7.4E-01 J	3.3E+00	MG/KG	CAS004-4HA05-00-1199	2/10	0.07 - 1.5	3.3E+00	1.5E+00	YES	7.0E+00 N	NO	1.4E+00	YES	ASL-SSL
	7440-70-2	Calcium	1.4E+02	8.4E+03	MG/KG	CAS004-4HA03-00-1199	10/10	5.4 - 1502.4	8.4E+03	2.3E+03	YES	N/A	NUT	N/A	NUT	NUT
	7440-47-3	**Chromium**	**6.9E+00**	**4.5E+01 K**	**MG/KG**	**CAS04-SS02-1109**	**10/10**	**1.2 - 3**	**4.5E+01**	**1.8E+01**	**YES**	**2.9E-01 C**	**YES**	**8.3E-04**	**YES**	**ASL-RSL, ASL-SSL**
	7440-48-4	Cobalt	1.1E+00	4.6E+00 J	MG/KG	CAS004-4HA05-00-1199	9/10	0.077 - 15	4.6E+00	9.9E+00	NO	2.3E+00 N	N/A	4.9E-01	N/A	BBK

Table 2.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	7440-50-8	Copper	1.8E+00 K	1.5E+02	MG/KG	CAS004-4HA05-00-1199	8/10	1.9 - 7.5	1.5E+02	4.3E+00	YES	3.1E+02 N	NO	5.1E+01	YES	ASL-SSL
	57-12-5	Cyanide	1.1E-01 L	1.3E-01 L	MG/KG	CAS004-4HA02D-00-1199	2/10	0.02 - 0.84	1.3E-01	ND	YES	1.6E+02 N	NO	7.4E+00	NO	BSL
	7439-89-6	**Iron**	**4.4E+03 J**	**2.8E+04**	**MG/KG**	**CAS04-SS02-1109**	**10/10**	**7.7 - 30**	**2.8E+04**	**2.0E+04**	**YES**	**5.5E+03 N**	**YES**	**6.4E+02**	**YES**	**ASL-RSL, ASL-SSL**
	7439-92-1	Lead	7.9E+00 K	1.3E+02	MG/KG	CAS004-4HA05-00-1199	10/10	0.38 - 0.9	1.3E+02	1.7E+01	YES	4.0E+02 NL	NO	N/A	N/A	BSL
	7439-95-4	Magnesium	3.5E+02 K	2.3E+03 K	MG/KG	CAS04-SS02-1109	10/10	3.8 - 1502.4	2.3E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	Manganese	2.5E+01 J	2.3E+02	MG/KG	CAS004-4HA02-00-1199	10/10	0.38 - 4.5	2.3E+02	3.2E+02	NO	1.8E+02 N	N/A	5.7E+01	N/A	BBK
	7439-97-6	Mercury	1.0E-02 J	8.8E-01	MG/KG	CAS004-4HA05-00-1199	10/10	0.034 - 0.2	8.8E-01	1.1E-01	YES	2.3E+00 N	NO	5.7E-01	YES	ASL-SSL
	7440-02-0	Nickel	2.2E+00 J	1.2E+01	MG/KG	CAS004-4HA05-00-1199	7/10	3.1 - 12	1.2E+01	9.5E+00	YES	1.5E+02 N	NO	4.8E+01	NO	BSL
	7440-09-7	Potassium	2.8E+02 K	2.6E+03 K	MG/KG	CAS04-SS02-1109	10/10	77 - 1502.4	2.6E+03	7.1E+02	YES	N/A	NUT	N/A	NUT	NUT
	7782-49-2	Selenium	1.8E-01 J	1.0E+00 J	MG/KG	CAS004-4HA04-00-1199	6/10	0.38 - 1.5	1.0E+00	5.1E-01	YES	3.9E+01 N	NO	9.5E-01	YES	ASL-SSL
	7440-23-5	Sodium	1.4E+01 K	5.0E+01 K	MG/KG	CAS04-SS02-1109	5/10	77 - 1502.4	5.0E+01	5.2E+02	NO	N/A	N/A	N/A	N/A	BBK
	7440-62-2	**Vanadium**	**9.8E+00**	**6.4E+01**	**MG/KG**	**CAS04-SS02-1109**	**10/10**	**0.38 - 15**	**6.4E+01**	**2.8E+01**	**YES**	**3.9E+01 N**	**YES**	**1.8E+02**	**NO**	**ASL-RSL**
	7440-66-6	Zinc	1.0E+01 K	3.2E+02	MG/KG	CAS004-4HA05-00-1199	8/10	1.9 - 6	3.2E+02	2.7E+01	YES	2.3E+03 N	NO	6.8E+02	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and SSLs.

[4] Background values from CAX/Yorktown surface soil background soil; values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Residential Soil RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan II.
RSL value for endrin used as surrogate for endrin aldehyde and endrin ketone.

[6] Risk-based Soil Screening Levels. ORNL. May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml

[7] Rationale Codes

Selection Reason: Above Regional Screening Level (ASL-RSL)
Above Soil Screening Level (ASL-SSL), not evaluated quantitatively
No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels

TABLE 2.1a

Step 2 Soil Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Surface Soil

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)anthracene	7 / 10	1.1E+00 J	CAS004-4HA02-00-1199, CAS004-4HA05-00-1199	1.5E-01	1E-06	NA	7E-06	NA
Benzo(a)pyrene	7 / 10	2.3E+00 J	CAS004-4HA05-00-1199	1.5E-02	1E-06	NA	2E-04	NA
Benzo(b)fluoranthene	9 / 10	1.7E+00 J	CAS004-4HA05-00-1199	1.5E-01	1E-06	NA	1E-05	NA
Benzo(k)fluoranthene	7 / 10	1.7E+00 J	CAS004-4HA05-00-1199	1.5E+00	1E-06	NA	1E-06	NA
Indeno(1,2,3-cd)pyrene	7 / 10	1.3E+00 J	CAS004-4HA05-00-1199	1.5E-01	1E-06	NA	9E-06	NA
Pesticides/PCBs (mg/kg)								
Aldrin	1 / 10	3.3E-02 K	CAS004-4HA05-00-1199	2.9E-02	1E-06	NA	1E-06	NA
Aroclor-1242	1 / 10	1.0E+00 K	CAS004-4HA05-00-1199	2.2E-01	1E-06	NA	5E-06	NA
Aroclor-1260	8 / 10	2.7E+00 K	CAS004-4HA05-00-1199	2.2E-01	1E-06	NA	1E-05	NA
Metals (mg/kg)								
Aluminum	10 / 10	2.9E+04	CAS04-SS02-1109	7.7E+04	1	0.4	NA	Developmental, Neurological
Arsenic	10 / 10	6.4E+00	CAS04-SS02-1109	3.9E-01	1E-06	NA	2E-05	NA
Chromium	10 / 10	4.5E+01 K	CAS04-SS02-1109	2.9E-01	1E-06	NA	2E-04	NA
Iron	10 / 10	2.8E+04	CAS04-SS02-1109	5.5E+04	1	0.5	NA	Gastrointestinal
Vanadium	10 / 10	6.4E+01	CAS04-SS02-1109	3.9E+02	1	0.2	NA	Hair Cystine
Cumulative Corresponding Hazard Index[c]						**1**		
Cumulative Corresponding Cancer Risk[d]							**4E-04**	

Total Developmental HI =	0.4
Total Neurological HI =	0.4
Total Gastrointestinal HI =	0.5
Total Hair Cystine HI =	0.2

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

K = Biased High

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.1b

Step 3 Soil Screening - Risk Ratio, 95% UCL

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Surface Soil

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)									
Benzo(a)anthracene	7 / 10	1.1E+00	Max	6	1.5E-01	1E-06	NA	7E-06	NA
Benzo(a)pyrene	7 / 10	2.3E+00	Max	6	1.5E-02	1E-06	NA	2E-04	NA
Benzo(b)fluoranthene	9 / 10	1.2E+00	95% KM	1, 3	1.5E-01	1E-06	NA	8E-06	NA
Benzo(k)fluoranthene	7 / 10	6.0E-01	95% KM-BCA	1, 3	1.5E+00	1E-06	NA	4E-07	NA
Indeno(1,2,3-cd)pyrene	7 / 10	1.3E+00	Max	6	1.5E-01	1E-06	NA	9E-06	NA
Pesticides (mg/kg)									
Aldrin	1 / 10	3.3E-02	Max	7	2.9E-02	1E-06	NA	1E-06	NA
Aroclor-1242	1 / 10	1.0E+00	Max	7	2.2E-01	1E-06	NA	5E-06	NA
Aroclor-1260	8 / 10	2.7E+00	Max	6	2.2E-01	1E-06	NA	1E-05	NA
Metals (mg/kg)									
Arsenic	10 / 10	3.9E+00	95% Stud-t	1, 2, 3	3.9E-01	1E-06	NA	1E-05	NA
Chromium	10 / 10	2.4E+01	G-App	1, 3	2.9E-01	1E-06	NA	8E-05	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**3E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram

HI = Hazard Index

NA = Not available/not applicable

RSL = Regional Screening Levels

UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations

in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max); 95% Kaplan-Meier (BCA) UCL (95% KM-BCA); 95% Kaplan-Meier Chebyshev (95% KM); Approximate Gamma UCL (G-App); 95% Student's-T test UCL (95% Stud-t).

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

(7) The maximum detected concentration was used as the UCL because there too few distinct values.

Table 2.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Subsurface Soil	78-93-3	2-Butanone	8.0E-03 J	8.0E-03 J	MG/KG	CAS004-4-HA02-02-1199	1/9	0.008 - 0.028	8.0E-03	N/A	N/A	2.8E+03 N	NO	1.5E+00	NO	BSL
Site 4	67-64-1	Acetone	9.8E-02	1.2E-01 J	MG/KG	CAS04-SB04-1109	2/9	0.01304 - 0.043	1.2E-01	N/A	N/A	6.1E+03 N	NO	4.5E+00	NO	BSL
	67-66-3	Chloroform	1.0E-03 J	1.0E-03 J	MG/KG	CAS04-SB04-1109	1/9	0.006 - 0.02041	1.0E-03	N/A	N/A	2.9E-01 C	NO	5.3E-05	YES	ASL-SSL
	100-41-4	Ethylbenzene	2.0E-03 J	2.0E-03 J	MG/KG	CAS004-4-HA02-02-1199	1/9	0.002 - 0.02041	2.0E-03	N/A	N/A	5.4E+00 C	NO	1.7E-03	YES	ASL-SSL
	75-09-2	Methylene chloride	1.2E-02 J	1.2E-02 J	MG/KG	CAS04-SB04-1109	1/9	0.007 - 0.028	1.2E-02	N/A	N/A	1.1E+01 C	NO	1.2E-03	YES	ASL-SSL
	127-18-4	Tetrachloroethene	3.0E-03 J	3.0E-03 J	MG/KG	CAS004-4-HA03-02-1199	1/9	0.003 - 0.02041	3.0E-03	N/A	N/A	5.5E-01 C	NO	4.9E-05	YES	ASL-SSL
	108-88-3	Toluene	2.0E-03 J	2.0E-03 J	MG/KG	CAS04-SB04-1109	1/9	0.005 - 0.02041	2.0E-03	N/A	N/A	5.0E+02 NS	NO	1.6E+00	NO	BSL
	56-55-3	Benzo(a)anthracene	6.2E-03 J	7.7E-02 J	MG/KG	CAS004-4-HA02-02-1199	5/9	0.02 - 17	7.7E-02	N/A	N/A	1.5E-01 C	NO	1.0E-02	YES	ASL-SSL
	50-32-8	**Benzo(a)pyrene**	**1.1E-01 J**	**5.5E-01 J**	**MG/KG**	**CAS004-4-HA05-01-1199**	**2/9**	**0.02 - 17**	**5.5E-01**	**N/A**	**N/A**	**1.5E-02 C**	**YES**	**3.5E-03**	**YES**	**ASL-RSL, ASL-SSL**
	205-99-2	**Benzo(b)fluoranthene**	**1.3E-01 J**	**5.1E-01 J**	**MG/KG**	**CAS004-4-HA05-01-1199**	**2/9**	**0.02 - 17**	**5.1E-01**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**3.5E-02**	**YES**	**ASL-RSL, ASL-SSL**
	191-24-2	Benzo(g,h,i)perylene	7.9E-02 J	7.9E-02 J	MG/KG	CAS004-4-HA02-02-1199	1/9	0.02 - 17	7.9E-02	N/A	N/A	1.7E+02 N	NO	1.2E+02	NO	BSL
	207-08-9	Benzo(k)fluoranthene	6.4E-02 J	4.9E-01 J	MG/KG	CAS004-4-HA05-01-1199	2/9	0.02 - 17	4.9E-01	N/A	N/A	1.5E+00 C	NO	3.5E-01	YES	ASL-SSL
	117-81-7	**bis(2-Ethylhexyl)phthalate**	**6.3E+01 J**	**6.3E+01 J**	**MG/KG**	**CAS004-4-HA03-02-1199**	**1/9**	**0.1 - 63**	**6.3E+01**	**N/A**	**N/A**	**3.5E+01 C***	**YES**	**1.1E+00**	**YES**	**ASL-RSL, ASL-SSL**
	218-01-9	Chrysene	1.3E-01 J	1.3E-01 J	MG/KG	CAS004-4-HA02-02-1199	1/9	0.02 - 17	1.3E-01	N/A	N/A	1.5E+01 C	NO	1.1E+00	NO	BSL
	84-74-2	Di-n-butylphthalate	9.0E+01 J	9.0E+01 J	MG/KG	CAS004-4-HA04-01-1199	1/9	0.066 - 90	9.0E+01	N/A	N/A	6.1E+02 N	NO	9.2E+00	YES	ASL-SSL
	206-44-0	Fluoranthene	1.6E-01 J	8.8E-01 J	MG/KG	CAS004-4-HA05-01-1199	2/9	0.02 - 17	8.8E-01	N/A	N/A	2.3E+02 N	NO	1.6E+02	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	6.6E-02 J	6.6E-02 J	MG/KG	CAS004-4-HA02-02-1199	1/9	0.02 - 17	6.6E-02	N/A	N/A	1.5E-01 C	NO	1.2E-01	NO	BSL
	85-01-8	Phenanthrene	1.0E-01 J	1.0E-01 J	MG/KG	CAS004-4-HA02-02-1199	1/9	0.02 - 17	1.0E-01	N/A	N/A	1.7E+03 N	NO	3.6E+02	NO	BSL
	129-00-0	Pyrene	2.1E-01 J	9.3E-01 J	MG/KG	CAS004-4-HA05-01-1199	2/9	0.02 - 17	9.3E-01	N/A	N/A	1.7E+02 N	NO	1.2E+02	NO	BSL
	72-54-8	4,4'-DDD	4.5E-03 L	4.5E-03 L	MG/KG	CAS004-4-HA02-02-1199	1/9	0.0033 - 0.0067	4.5E-03	N/A	N/A	2.0E+00 C	NO	6.6E-02	NO	BSL
	72-55-9	4,4'-DDE	5.3E-03 P	2.4E-02 J	MG/KG	CAS004-4-HA04-01-1199	3/9	0.0033 - 0.024	2.4E-02	N/A	N/A	1.4E+00 C	NO	4.7E-02	NO	BSL
	50-29-3	4,4'-DDT	5.8E-03 P	1.5E-01 L	MG/KG	CAS004-4-HA05-01-1199	3/9	0.0033 - 0.15	1.5E-01	N/A	N/A	1.7E+00 C*	NO	6.7E-02	YES	ASL-SSL
	309-00-2	Aldrin	2.7E-02 J	2.7E-02 J	MG/KG	CAS004-4-HA05-01-1199	1/9	0.0017 - 0.027	2.7E-02	N/A	N/A	2.9E-02 C*	NO	6.5E-04	YES	ASL-SSL
	5103-71-9	alpha-Chlordane	2.4E-03 J	2.4E-03 J	MG/KG	CAS004-4-HA05-01-1199	1/9	0.0017 - 0.0034	2.4E-03	N/A	N/A	1.6E+00 C*	NO	1.3E-02	NO	BSL
	53469-21-9	**Aroclor-1242**	**2.3E+00 L**	**2.3E+00 L**	**MG/KG**	**CAS004-4-HA05-01-1199**	**1/9**	**0.018 - 2.3**	**2.3E+00**	**N/A**	**N/A**	**2.2E-01 C**	**YES**	**5.3E-03**	**YES**	**ASL-RSL, ASL-SSL**
	11096-82-5	**Aroclor-1260**	**5.1E-02 K**	**1.6E+00 L**	**MG/KG**	**CAS004-4-HA05-01-1199**	**3/9**	**0.018 - 1.6**	**1.6E+00**	**N/A**	**N/A**	**2.2E-01 C**	**YES**	**2.4E-02**	**YES**	**ASL-RSL, ASL-SSL**
	33213-65-9	Endosulfan II	6.5E-03 K	6.5E-03 K	MG/KG	CAS004-4-HA03-02-1199	1/9	0.0033 - 0.0067	6.5E-03	N/A	N/A	3.7E+01 N	NO	3.0E+00	NO	BSL
	53494-70-5	Endrin ketone	8.9E-03 J	1.9E-02 J	MG/KG	CAS004-4-HA05-01-1199	2/9	0.0033 - 0.019	1.9E-02	N/A	N/A	1.8E+00 N	NO	4.4E-01	NO	BSL
	5103-74-2	gamma-Chlordane	4.3E-03 J	4.3E-03 J	MG/KG	CAS004-4-HA05-01-1199	1/9	0.0017 - 0.0043	4.3E-03	N/A	N/A	1.6E+00 C*	NO	1.3E-02	NO	BSL
	76-44-8	Heptachlor	9.9E-03 J	9.9E-03 J	MG/KG	CAS004-4-HA05-01-1199	1/9	0.0017 - 0.0099	9.9E-03	N/A	N/A	1.1E-01 C	NO	1.2E-03	YES	ASL-SSL
	72-43-5	Methoxychlor	2.5E-02 J	2.5E-02 J	MG/KG	CAS004-4-HA05-01-1199	1/9	0.017 - 0.034	2.5E-02	N/A	N/A	3.1E+01 N	NO	9.9E+00	NO	BSL
	7429-90-5	**Aluminum**	**3.7E+03 L**	**2.9E+04**	**MG/KG**	**CAS04-SB01-1109**	**9/9**	**22 - 9660**	**2.9E+04**	**1.3E+04**	**YES**	**7.7E+03 N**	**YES**	**5.5E+04**	**NO**	**ASL-RSL**
	7440-36-0	Antimony	4.0E-02 L	1.5E-01 L	MG/KG	CAS04-SB01-1109	5/9	0.073 - 1.1	1.5E-01	ND	YES	3.1E+00 N	NO	6.6E-01	NO	BSL
	7440-38-2	**Arsenic**	**6.2E-01**	**6.9E+00**	**MG/KG**	**CAS04-SB01-1109**	**9/9**	**0.37 - 3.9**	**6.9E+00**	**5.5E+00**	**YES**	**3.9E-01 C***	**YES**	**1.3E-03**	**YES**	**ASL-RSL, ASL-SSL**
	7440-39-3	Barium	2.0E+01 J	2.5E+02	MG/KG	CAS004-4-HA04-01-1199	9/9	0.37 - 247	2.5E+02	8.5E+01	YES	1.5E+03 N	NO	3.0E+02	NO	BSL
	7440-41-7	Beryllium	3.5E-01 J	5.7E-01	MG/KG	CAS04-SB05-1109	5/9	0.31 - 0.55	5.7E-01	5.2E-01	YES	1.6E+01 N	NO	5.8E+01	NO	BSL
	7440-43-9	Cadmium	7.0E-02 J	1.2E+00 J	MG/KG	CAS004-4-HA05-01-1199	3/9	0.08 - 2.2	1.2E+00	ND	YES	7.0E+00 N	NO	1.4E+00	NO	BSL
	7440-70-2	Calcium	1.1E+02 J	6.0E+03	MG/KG	CAS004-4-HA04-01-1199	9/9	5.1 - 5970	6.0E+03	2.4E+03	YES	N/A	NUT	N/A	NUT	NUT
	7440-47-3	**Chromium**	**6.1E+00 K**	**4.0E+01 K**	**MG/KG**	**CAS04-SB01-1109**	**9/9**	**1.1 - 17.4**	**4.0E+01**	**3.4E+01**	**YES**	**2.9E-01 C**	**YES**	**8.3E-04**	**YES**	**ASL-RSL, ASL-SSL**
	7440-48-4	Cobalt	1.6E+00 J	4.3E+00 J	MG/KG	CAS004-4-HA03-02-1199	9/9	0.073 - 4.3	4.3E+00	5.2E+00	NO	2.3E+00 N	N/A	4.9E-01	N/A	BBK

Table 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	7440-50-8	Copper	2.7E+00	4.0E+01	MG/KG	CAS004-4-HA03-02-1199	7/9	1.8 - 40.4	4.0E+01	3.2E+00	YES	3.1E+02 N	NO	5.1E+01	NO	BSL
	57-12-5	Cyanide	4.4E-01 L	4.4E-01 L	MG/KG	CAS004-4-HA04-01-1199	1/9	0.03 - 0.84	4.4E-01	2.7E+00	NO	1.6E+02 N	N/A	7.4E+00	N/A	BBK
	7439-89-6	Iron	3.8E+03	3.2E+04	MG/KG	CAS04-SB01-1109	9/9	7.3 - 19300	3.2E+04	3.2E+04	NO	5.5E+03 N	N/A	6.4E+02	N/A	BBK
	7439-92-1	Lead	4.4E+00 K	4.5E+01	MG/KG	CAS004-4-HA03-02-1199	9/9	0.37 - 45.3	4.5E+01	8.8E+00	YES	4.0E+02 NL	NO	N/A	N/A	BSL
	7439-95-4	Magnesium	3.3E+02 J	1.7E+03 J	MG/KG	CAS04-SB05-1109	9/9	3.7 - 1310	1.7E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	Manganese	2.3E+01 J	1.2E+02	MG/KG	CAS004-4-HA03-02-1199	9/9	0.37 - 120	1.2E+02	1.8E+02	NO	1.8E+02 N	N/A	5.7E+01	N/A	BBK
	7439-97-6	Mercury	1.0E-02 J	9.1E-01	MG/KG	CAS004-4-HA03-02-1199	8/9	0.03 - 0.91	9.1E-01	1.4E-01	YES	2.4E+00 N	NO	5.7E-01	YES	ASL-SSL
	7440-02-0	Nickel	2.8E+00 J	1.7E+01	MG/KG	CAS004-4-HA03-02-1199	7/9	2.9 - 17.3	1.7E+01	1.8E+01	NO	1.5E+02 N	N/A	4.8E+01	N/A	BBK
	7440-09-7	Potassium	3.1E+02 K	1.9E+03 K	MG/KG	CAS04-SB05-1109	8/9	73 - 1700	1.9E+03	9.0E+02	YES	N/A	NUT	N/A	NUT	NUT
	7782-49-2	Selenium	2.0E-01 J	7.8E-01 J	MG/KG	CAS004-4-HA02-02-1199	6/9	0.37 - 0.94	7.8E-01	6.4E-01	YES	3.9E+01 N	NO	9.5E-01	NO	BSL
	7440-23-5	Sodium	1.6E+01 K	5.5E+01 K	MG/KG	CAS04-SB01-1109	5/9	11.6 - 110	5.5E+01	8.1E+02	NO	N/A	N/A	N/A	N/A	BBK
	7440-28-0	Thallium	3.3E-01	3.3E-01	MG/KG	CAS04-SB01-1109	1/9	0.15 - 0.75	3.3E-01	ND	YES	N/A	N/A	1.7E-01	YES	ASL-SSL
	7440-62-2	**Vanadium**	**7.8E+00**	**5.8E+01**	**MG/KG**	**CAS04-SB01-1109**	**8/9**	**0.37 - 20.5**	**5.8E+01**	**4.8E+01**	**YES**	**3.9E+01 N**	**YES**	**1.8E+02**	**NO**	**ASL-RSL**
	7440-66-6	Zinc	7.8E+00 K	3.7E+02	MG/KG	CAS004-4-HA04-01-1199	8/9	1.8 - 373	3.7E+02	2.8E+01	YES	2.3E+03 N	NO	6.8E+02	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and SSLs.
[4] Background values from CAX/Yorktown subsurface soil background soil; values represent the 95% UTL.
[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan II.
RSL value for endrin used as surrogate for endrin ketone.
[6] Risk-based Soil Screening Levels. ORNL. May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml
[7] Rationale Codes

Selection Reason:
- Above Regional Screening Level (ASL-RSL)
- Above Soil Screening Level (ASL-SSL), not evaluated quantitatively
- No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason:
- Below Background (BBK)
- Below Screening Level (BSL)
- Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels

TABLE 2.2a

Step 2 Soil Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Subsurface Soil

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)pyrene	2 / 9	5.5E-01 J	CAS004-4-HA05-01-1199	1.5E-02	1E-06	NA	4E-05	NA
Benzo(b)fluoranthene	2 / 9	5.1E-01 J	CAS004-4-HA05-01-1199	1.5E-01	1E-06	NA	3E-06	NA
bis(2-Ethylhexyl)phthalate	1 / 9	6.3E+01 J	CAS004-4-HA03-02-1199	3.5E+01	1E-06	NA	2E-06	NA
Pesticides/PCBs (mg/kg)								
Aroclor-1242	1 / 9	2.3E+00 L	CAS004-4-HA05-01-1199	2.2E-01	1E-06	NA	1E-05	NA
Aroclor-1260	3 / 9	1.6E+00 L	CAS004-4-HA05-01-1199	2.2E-01	1E-06	NA	7E-06	NA
Metals (mg/kg)								
Aluminum	9 / 9	2.9E+04	CAS04-SB01-1109	7.7E+04	1	0.4	NA	Developmental, Neurological
Arsenic	9 / 9	6.9E+00	CAS04-SB01-1109	3.9E-01	1E-06	NA	2E-05	NA
Chromium	9 / 9	4.0E+01 K	CAS04-SB01-1109	2.9E-01	1E-06	NA	1E-04	NA
Vanadium	8 / 9	5.8E+01	CAS04-SB01-1109	3.9E+02	1	0.1	NA	Hair Cystine
Cumulative Corresponding Hazard Index[c]						**0.5**		
Cumulative Corresponding Cancer Risk[d]							**2E-04**	
							Total Developmental HI =	0.4
							Total Neurological HI =	0.4
							Total Hair Cystine HI =	0.1

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

K = Biased High

L = Biased Low

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.2b

Step 3 Soil Screening - Risk Ratio, 95% UCL

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Subsurface Soil

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)									
Benzo(a)pyrene	2 / 9	5.5E-01	95% KM-BCA	4	1.5E-02	1E-06	NA	4E-05	NA
Benzo(b)fluoranthene	2 / 9	3.2E-01	95% KM-t	4	1.5E-01	1E-06	NA	2E-06	NA
bis(2-Ethylhexyl)phthalate	1 / 9	6.3E+01	Max	7	3.5E+01	1E-06	NA	2E-06	NA
Pesticides (mg/kg)									
Aroclor-1242	1 / 9	2.3E+00	Max	7	2.2E-01	1E-06	NA	1E-05	NA
Aroclor-1260	3 / 9	6.2E-01	95% KM-t	1, 2	2.2E-01	1E-06	NA	3E-06	NA
Metals (mg/kg)									
Arsenic	9 / 9	4.8E+00	95% Stud-t	1, 2, 3	3.9E-01	1E-06	NA	1E-05	NA
Chromium	9 / 9	2.7E+01	95% Stud-t	1, 2, 3	2.9E-01	1E-06	NA	9E-05	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**2E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram

HI = Hazard Index

NA = Not available/not applicable

RSL = Regional Screening Levels

UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations
in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max); 95% Kaplan-Meier (BCA) UCL (95% KM-BCA);95% Kaplan-Meier (t) UCL (95% KM-t); 95% Student's-T test UCL (95% Stud-t).

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

(7) The maximum detected concentration was used as the UCL because there too few distinct values.

Table 2.3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] MCL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Groundwater Site 4	**127-18-4**	**Tetrachloroethene**	**1.0E+00 J**	**1.0E+00 J**	**UG/L**	**CAS04-GW04-1009, CAS04-GW04P-1009**	**1/4**	**3 - 3**	**1.0E+00**	**N/A**	**N/A**	**1.1E-01 C**	**YES**	**5.0E+00**	**NO**	**ASL-RSL**
	79-01-6	Trichloroethene	4.0E-01 J	4.0E-01 J	UG/L	CAS04-GW03-1009	1/4	1 - 1	4.0E-01	N/A	N/A	2.0E+00 C	NO	5.0E+00	NO	BSL
	7429-90-5	Aluminum	2.1E+02 J	2.7E+03	UG/L	CAS04-GW02-1009	2/4	300 - 300	2.7E+03	2.2E+03	YES	3.7E+03 N	NO	N/A	N/A	BSL
	7440-36-0	Antimony	1.7E-01 J	4.0E-01 J	UG/L	CAS04-GW02-1009	3/4	1 - 1	4.0E-01	1.9E+01	NO	1.5E+00 N	N/A	6.0E+00	N/A	BBK
	7440-38-2	**Arsenic**	**1.8E+00 J**	**7.4E+00**	**UG/L**	**CAS04-GW02-1009**	**2/4**	**5 - 5**	**7.4E+00**	**2.3E+00**	**YES**	**4.5E-02 C**	**YES**	**1.0E+01**	**NO**	**ASL-RSL**
	7440-39-3	Barium	1.2E+01	2.6E+01	UG/L	CAS04-GW02-1009	4/4	5 - 5	2.6E+01	1.2E+02	NO	7.3E+02 N	N/A	2.0E+03	N/A	BBK
	7440-41-7	Beryllium	1.6E-01 J	1.6E-01 J	UG/L	CAS04-GW02-1009	1/4	1 - 1	1.6E-01	2.5E+00	NO	7.3E+00 N	N/A	4.0E+00	N/A	BBK
	7440-43-9	Cadmium	6.0E-02 J	2.9E-01 J	UG/L	CAS04-GW02-1009	3/4	1 - 1	2.9E-01	6.1E-01	NO	1.8E+00 N	N/A	5.0E+00	N/A	BBK
	7440-70-2	Calcium	8.3E+04	1.5E+05	UG/L	CAS04-GW04P-1009	4/4	50 - 50	1.5E+05	1.7E+05	NO	N/A	N/A	N/A	N/A	BBK
	7440-47-3	Chromium	4.4E-01 J	9.8E+00 J	UG/L	CAS04-GW02-1009	4/4	15 - 15	9.8E+00	1.5E+01	NO	4.3E-02 C	N/A	1.0E+02	N/A	BBK
	7440-48-4	Cobalt	5.8E-01 J	1.3E+00 J	UG/L	CAS04-GW02-1009	3/4	30 - 30	1.3E+00	2.1E+01	NO	1.1E+00 N	N/A	N/A	N/A	BBK
	7440-50-8	Copper	5.1E+00 J	5.1E+00 J	UG/L	CAS04-GW04-1009	1/4	25 - 25	5.1E+00	1.2E+01	NO	1.5E+02 N	N/A	1.3E+03	N/A	BBK
	7439-89-6	**Iron**	**3.0E+02**	**5.0E+03**	**UG/L**	**CAS04-GW02-1009**	**3/4**	**100 - 100**	**5.0E+03**	**8.9E+02**	**YES**	**2.6E+03 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7439-92-1	Lead	1.2E+00 J	3.0E+00 J	UG/L	CAS04-GW02-1009	2/4	5 - 5	3.0E+00	2.1E+01	NO	1.5E+01 AL	N/A	1.5E+01	N/A	BBK
	7439-95-4	Magnesium	9.5E+02	2.4E+03	UG/L	CAS04-GW02-1009	4/4	50 - 50	2.4E+03	1.2E+04	NO	N/A	N/A	N/A	N/A	BBK
	7439-96-5	**Manganese**	**2.7E+01**	**1.8E+02**	**UG/L**	**CAS04-GW01-1009**	**4/4**	**5 - 5**	**1.8E+02**	**5.8E+01**	**YES**	**8.8E+01 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7440-02-0	Nickel	6.9E-01 J	3.5E+00 J	UG/L	CAS04-GW02-1009	4/4	40 - 40	3.5E+00	1.1E+01	NO	7.3E+01 N	N/A	N/A	N/A	BBK
	7440-09-7	Potassium	4.2E+02 J	3.4E+03	UG/L	CAS04-GW04P-1009	4/4	1000 - 1000	3.4E+03	1.3E+04	NO	N/A	N/A	N/A	N/A	BBK
	7440-23-5	Sodium	2.3E+03	9.0E+03	UG/L	CAS04-GW04P-1009	4/4	1000 - 1000	9.0E+03	6.5E+04	NO	N/A	N/A	N/A	N/A	BBK
	7440-62-2	Vanadium	1.1E+01 J	1.1E+01 J	UG/L	CAS04-GW02-1009	1/4	25 - 25	1.1E+01	2.6E+01	NO	1.8E+01 N	N/A	N/A	N/A	BBK
	7440-66-6	Zinc	4.0E+00 J	9.0E+00 J	UG/L	CAS04-GW02-1009	3/4	25 - 25	9.0E+00	4.5E+00	YES	1.1E+03 N	NO	N/A	N/A	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and MCLs.

[4] Background values from CAX/Yorktown groundwater Yorkown-Eastover Aquiver background sample group (YE); values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Tap Water RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). [Online].
Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for Chromium(VI) used as surrogate for chromium.
The Federal Action Level for Lead is used as its SL.
RSL value for Manganese (water) used as surrogate for manganese.

[6] Drinking water Maximum Contaminant Level (MCL) (USEPA, 2009).

COPC = Chemical of Potential Concern
J = Estimated Value
C = Carcinogenic
C* = where: N SL < 100X C SL
N = Noncarcinogenic
N/A = Not available or Not applicable
NE = Not established.
ND = Not detected
RSL = Regional Screening Levels
AL = Action Level

Table 2.3
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] MCL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection

[7] Rationale Codes

Selection Reason: Above Tap Water Screening Levels (ASL-RSL)
Above Maximim Contaminant Levels (ASL-MCL)
No Toxicity Information (NTX), not quantified

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

TABLE 2.3a

Step 2 Groundwater Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Groundwater

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Volatile Organic Compounds (ug/L)								
Tetrachloroethene	1 / 4	1.0E+00 J	CAS04-GW04-1009, CAS04-GW04P-1009	1.1E-01	1E-06	NA	9E-06	NA
Metals (ug/L)								
Arsenic	2 / 4	7.4E+00	CAS04-GW02-1009	4.5E-02	1E-06	NA	2E-04	NA
Iron	3 / 4	5.0E+03	CAS04-GW02-1009	2.6E+04	1	0.2	NA	Gastrointestinal
Manganese	4 / 4	1.8E+02	CAS04-GW01-1009	8.8E+02	1	0.2	NA	CNS
Cumulative Corresponding Hazard Index[c]						**0.4**		
Cumulative Corresponding Cancer Risk[d]							**2E-04**	
							Total Gastrointestinal HI =	0.2
							Total CNS HI =	0.2

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

µg/L = micrograms per liter

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [6] Contaminant Deletion or Selection
Groundwater															
Vapor Intrusion	**127-18-4**	**Tetrachloroethene**	**1.0E+00 J**	**1.0E+00 J**	**UG/L**	**CAS04-GW04-1009, CAS04-GW04P-1009**	**1/4**	**3 - 3**	**1.0E+00**	**N/A**	**7.8E-01 C**	5.0E+00	MCL	**YES**	**ASL-VI GWSL**
Into Indoor Air	79-01-6	Trichloroethene	4.0E-01 J	4.0E-01 J	UG/L	CAS04-GW03-1009	1/4	1 - 1	4.0E-01	N/A	4.1E+00 C	5.0E+00	MCL	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values from CAX groundwater background sample group (CC); values represent the 95% UTL.

[4] Vapor Intrusion Groundwater Screening Levels. See Table 2.4 Supplement A

[5] Drinking water Maximum Contaminant Level (MCL) (USEPA, 2009).

[6] Rationale Codes

Selection Reason: Above Screening Levels (ASL-VI GWSL)
No Toxicity Information (NTX)

Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

COPC = Chemical of Potential Concern
J = Estimated Value
C = Carcinogenic
C* = where: N SL < 100X C SL
N = Noncarcinogenic
N/A = Not available or Not applicable

Table 2.4 Supplement A

Calculation of Target Groundwater Concentrations for Vapor Intrusion Screening [1]

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Indoor Air

CAS Number	Constituent	Target Indoor Air Concentration[2], carcinogen (C_{Cancer}) ug/m^3	Target Indoor Air Concentration[2], non-carcinogen ($C_{non\text{-}Cancer}$) ug/m^3	Target Indoor Air Concentration ($C_{target,ia}$) ug/m^3	System Temperature Henry's Law Constant (H'TS)[3] Dimensionless	Risk-Based Target Groundwater Concentration (C_{gw}) ug/L
127-18-4	Tetrachloroethene	4.1E-01	2.8E+01	4.1E-01	5.3E-01	7.8E-01
79-01-6	Trichloroethene	1.2E+00	N/A	1.2E+00	2.9E-01	4.1E+00

Notes:

[1] The vapor intrusion screening levels [i.e., target groundwater concentration from Table 2c, Subsurface Vapor Intrusion Guidance (EPA, 2002)] were updated using the methodology presented in Appendix D of Subsurface Vapor Intrusion Guidance (EPA, 2002).

[2] Values are Regional Screening Levels (RSL) for residential air (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). [Oak Ridge National Laboratory (ORNL), May 2010].

[3] H'TS = Henry's Law Constant (demensionless) at system (i.e., groundwater) temperature. Calculated using equation 3 from USEPA, 2004. Average groundwater temperature (17.8°C) based on data from October/November 2009 sampling event.

N/A = Not available.

Variables	Units	Value
$C_{target,ia}$ = Target indoor air conc., minimum	ug/m^3	Solved by Eq. 1
C_{gw} = Target groundwater conc.	ug/L	Solved by Eq. 2
TCR = Target Cancer Risk	unitless	1.00E-06
THQ = Target Hazard Quotient	unitless	1
URF = Unit Risk Factor	(ug/m^3)$^{-1}$	Chemical-specific
RfC = Reference Concentration	mg/m^3	Chemical-specific
H = Dimensionless Henry's Law Constant	unitless	Chemical-specific
alpha (α) = Attenuation Factor	unitless	0.001

Equation 1: $C_{target,ia}$ = Minimum(C_{cancer}, $C_{non\text{-}cancer}$)

Equation 2: Cgw = $C_{target,ia} \times 10^{-3}$ m^3/L * 1/H'TS * 1/α

Table 2.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Surface Water	207-08-9	Benzo(k)fluoranthene	6.9E-02 J	6.9E-02 J	UG/L	CAS04-SW05-1209	1/5	0.19 - 0.19	6.9E-02	N/A	2.9E+00 C	N/A	N/A	NO	BSL
Site 4	117-81-7	bis(2-Ethylhexyl)phthalate	4.8E-01 J	1.5E+00	UG/L	CAS04-SW07P-1209, CAS04-SW08-1209	3/5	0.94 - 0.96	1.5E+00	N/A	4.8E+01 C	N/A	N/A	NO	BSL
Drainage Ditches	206-44-0	Fluoranthene	1.1E-01 J	1.8E-01 J	UG/L	CAS04-SW05-1209	2/5	0.19 - 0.19	1.8E-01	N/A	1.5E+03 N	N/A	N/A	NO	BSL
	85-01-8	Phenanthrene	6.9E-02 J	8.8E-02 J	UG/L	CAS04-SW05-1209	2/5	0.19 - 0.19	8.8E-02	N/A	1.1E+04 N	N/A	N/A	NO	BSL
	129-00-0	Pyrene	6.5E-02 J	2.9E-01 J	UG/L	CAS04-SW05-1209	3/5	0.19 - 0.19	2.9E-01	N/A	1.1E+03 N	N/A	N/A	NO	BSL
	7429-90-5	Aluminum	8.3E+01 J	1.1E+03	UG/L	CAS04-SW07P-1209	4/5	300 - 300	1.1E+03	N/A	3.7E+04 N	N/A	N/A	NO	BSL
	7440-38-2	**Arsenic**	**5.8E+01**	**5.8E+01**	**UG/L**	**CAS04-SW09-1209**	**1/5**	**5 - 5**	**5.8E+01**	**N/A**	**4.5E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-39-3	Barium	2.6E+01	4.3E+01	UG/L	CAS04-SW09-1209	5/5	1 - 1	4.3E+01	N/A	7.3E+03 N	N/A	N/A	NO	BSL
	7440-41-7	Beryllium	6.0E-02 J	6.0E-02 J	UG/L	CAS04-SW07P-1209	1/5	1 - 1	6.0E-02	N/A	7.3E+01 N	N/A	N/A	NO	BSL
	7440-43-9	Cadmium	1.6E-01 J	4.5E-01 J	UG/L	CAS04-SW07P-1209	3/5	1 - 1	4.5E-01	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	7440-70-2	Calcium	1.1E+05	1.3E+05	UG/L	CAS04-SW05-1209, CAS04-SW07P-1209	5/5	50 - 50	1.3E+05	N/A	N/A	N/A	N/A	NO	NUT
	7440-48-4	Cobalt	2.9E-01 J	1.1E+00	UG/L	CAS04-SW07P-1209	5/5	1 - 1	1.1E+00	N/A	1.1E+01 N	N/A	N/A	NO	BSL
	7440-50-8	Copper	1.3E+00	7.0E+00	UG/L	CAS04-SW07P-1209	5/5	1 - 1	7.0E+00	N/A	1.5E+03 N	N/A	N/A	NO	BSL
	7439-89-6	**Iron**	**3.4E+02**	**3.0E+04**	**UG/L**	**CAS04-SW09-1209**	**5/5**	**100 - 100**	**3.0E+04**	**N/A**	**2.6E+04 N**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7439-92-1	Lead	1.2E+00	2.6E+00	UG/L	CAS04-SW07P-1209	3/5	1 - 1	2.6E+00	N/A	1.5E+01 AL	N/A	N/A	NO	BSL
	7439-95-4	Magnesium	2.0E+03	2.7E+03	UG/L	CAS04-SW09-1209	5/5	50 - 50	2.7E+03	N/A	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	1.2E+01	2.5E+02	UG/L	CAS04-SW09-1209	5/5	5 - 5	2.5E+02	N/A	8.8E+02 N	N/A	N/A	NO	BSL
	7440-02-0	Nickel	2.0E+00 J	2.0E+00 J	UG/L	CAS04-SW07P-1209	1/5	40 - 40	2.0E+00	N/A	7.3E+02 N	N/A	N/A	NO	BSL
	7440-09-7	Potassium	1.7E+03	2.2E+03	UG/L	CAS04-SW07P-1209	3/5	1000 - 1000	2.2E+03	N/A	N/A	N/A	N/A	NO	NUT
	7782-49-2	Selenium	8.2E-01 J	1.3E+00 J	UG/L	CAS04-SW06-1209, CAS04-SW07-1209	4/5	5 - 5	1.3E+00	N/A	1.8E+02 N	N/A	N/A	NO	BSL
	7440-23-5	Sodium	5.5E+03	8.3E+03	UG/L	CAS04-SW07-1209	5/5	1000 - 1000	8.3E+03	N/A	N/A	N/A	N/A	NO	NUT
	7440-62-2	Vanadium	4.6E+00 J	4.6E+00 J	UG/L	CAS04-SW07P-1209	1/5	5 - 5	4.6E+00	N/A	1.8E+02 N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	1.3E+01 J	3.1E+01	UG/L	CAS04-SW07P-1209	4/5	25 - 25	3.1E+01	N/A	1.1E+04 N	N/A	N/A	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Tap Water RSLs adjusted by 10 for carcinogens (based on 10^{-7} for carcinogens and HQ of 1.0 for noncarcinogens). Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for anthracene used as surrogate for phenanthrene.
The Federal Action Level for Lead is used as its SL.
RSL value for Manganese (water) used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Tap Water Screening Levels (ASL-RSL)
No Toxicity Information (NTX), not quantified

Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
C = Carcinogenic
N = Noncarcinogenic
N/A = Not available or Not applicable
RSL = Regional Screening Levels
AL = Action Level

TABLE 2.5a

Step 2 Surface Water Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Surface Water

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Metals (ug/L)								
Arsenic	1 / 5	5.8E+01	CAS04-SW09-1209	4.5E-02	1E-06	NA	1E-03	NA
Iron	5 / 5	3.0E+04	CAS04-SW09-1209	2.6E+04	1	1	NA	Gastrointestinal
Cumulative Corresponding Hazard Index[c]						**1**		
Cumulative Corresponding Cancer Risk[d]							**1E-03**	
							Total Gastrointestinal HI =	**1**

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,
otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

µg/L = micrograms per liter

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.5b

Step 3 Surface Water Screening - Risk Ratio, 95% UCL

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 -Surface Water

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Metals (ug/L)									
Arsenic	1 / 5	5.8E+01	Max	7	4.5E-02	1E-06	NA	1E-03	NA
Iron	5 / 5	3.0E+04	Max	6	2.6E+04	1	1	NA	Gastrointestinal
Cumulative Corresponding Hazard Index[c]							**1**		
Cumulative Corresponding Cancer Risk[d]								**1E-03**	
								Total Gastrointestinal HI =	**1**

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

µg/L = micrograms per liter

HI = Hazard Index

NA = Not available/not applicable

RSL = Regional Screening Levels

UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations

in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max).

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

(7) The maximum detected concentration was used as the UCL because there too few distinct values.

Table 2.6

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Sediment (0-4")
Exposure Medium: Surface Sediment (0-4")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Sediment (0 - 4")	78-93-3	2-Butanone	2.5E-02 J	5.1E-02 J	MG/KG	CAS04-SD05-1209A	3/5	0.029 - 0.044	5.1E-02	N/A	2.8E+04 N	N/A	N/A	NO	BSL
Site 4	67-64-1	Acetone	1.2E-01 J	2.3E-01 J	MG/KG	CAS04-SD05-1209A	3/5	0.029 - 0.044	2.3E-01	N/A	6.1E+04 N	N/A	N/A	NO	BSL
Drainage Ditches	75-15-0	Carbon disulfide	2.0E-03 J	2.0E-03 J	MG/KG	CAS04-SD05-1209A	1/5	0.006 - 0.009	2.0E-03	N/A	7.38E+02 NS	N/A	N/A	NO	BSL
	127-18-4	Tetrachloroethene	4.0E-03 J	1.5E-02 J	MG/KG	CAS04-SD09-1209A	5/5	0.006 - 0.009	1.5E-02	N/A	5.5E+00 C	N/A	N/A	NO	BSL
	83-32-9	Acenaphthene	3.2E-03 J	1.2E-02 J	MG/KG	CAS04-SD05-1209A	2/5	0.025 - 0.036	1.2E-02	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	208-96-8	Acenaphthylene	5.4E-03 J	3.0E-02 J	MG/KG	CAS04-SD05-1209A	2/5	0.025 - 0.036	3.0E-02	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	120-12-7	Anthracene	2.3E-03 J	5.5E-02	MG/KG	CAS04-SD05-1209A	2/5	0.025 - 0.036	5.5E-02	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	56-55-3	Benzo(a)anthracene	5.3E-02	4.2E-01	MG/KG	CAS04-SD05-1209A	2/5	0.025 - 0.036	4.2E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	50-32-8	**Benzo(a)pyrene**	**9.0E-03 J**	**3.8E-01**	**MG/KG**	**CAS04-SD05-1209A**	**4/5**	**0.025 - 0.036**	**3.8E-01**	**N/A**	**1.5E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	205-99-2	Benzo(b)fluoranthene	8.2E-02	6.9E-01	MG/KG	CAS04-SD05-1209A	2/5	0.025 - 0.11	6.9E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	191-24-2	Benzo(g,h,i)perylene	1.0E-02 L	1.3E-01 L	MG/KG	CAS04-SD05-1209A	3/5	0.025 - 0.036	1.3E-01	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	207-08-9	Benzo(k)fluoranthene	1.1E-02 J	1.5E-01	MG/KG	CAS04-SD05-1209A	3/5	0.025 - 0.036	1.5E-01	N/A	1.5E+01 C	N/A	N/A	NO	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	1.0E-01 J	1.0E-01 J	MG/KG	CAS04-SD08-1209A	1/5	0.13 - 0.18	1.0E-01	N/A	3.5E+02 C*	N/A	N/A	NO	BSL
	86-74-8	Carbazole	6.0E-03 J	2.3E-02 J	MG/KG	CAS04-SD05-1209A	4/5	0.025 - 0.036	2.3E-02	N/A	N/A	N/A	N/A	NO	NTX
	218-01-9	Chrysene	3.1E-03 J	4.4E-01	MG/KG	CAS04-SD05-1209A	4/5	0.025 - 0.036	4.4E-01	N/A	1.5E+02 C	N/A	N/A	NO	BSL
	53-70-3	Dibenz(a,h)anthracene	1.6E-02 J	1.2E-01	MG/KG	CAS04-SD05-1209A	3/5	0.025 - 0.036	1.2E-01	N/A	1.5E-01 C	N/A	N/A	NO	BSL
	206-44-0	Fluoranthene	2.2E-02 J	8.2E-01	MG/KG	CAS04-SD05-1209A	4/5	0.025 - 0.11	8.2E-01	N/A	2.3E+03 N	N/A	N/A	NO	BSL
	86-73-7	Fluorene	3.0E-02 J	3.0E-02 J	MG/KG	CAS04-SD05-1209A	1/5	0.025 - 0.036	3.0E-02	N/A	2.3E+03 N	N/A	N/A	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	1.1E-02 J	3.0E-01	MG/KG	CAS04-SD05-1209A	4/5	0.025 - 0.036	3.0E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	91-20-3	Naphthalene	6.0E-03 J	6.0E-03 J	MG/KG	CAS04-SD05-1209A	1/5	0.025 - 0.036	6.0E-03	N/A	3.6E+01 C*	N/A	N/A	NO	BSL
	85-01-8	Phenanthrene	9.7E-03 J	3.4E-01	MG/KG	CAS04-SD05-1209A	4/5	0.025 - 0.036	3.4E-01	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	129-00-0	Pyrene	1.5E-02 J	6.9E-01	MG/KG	CAS04-SD05-1209A	4/5	0.025 - 0.11	6.9E-01	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	72-54-8	4,4'-DDD	1.6E-03 J	3.4E-02 J	MG/KG	CAS04-SD05-1209A	5/5	0.0041 - 0.0059	3.4E-02	N/A	2.0E+01 C	N/A	N/A	NO	BSL
	72-55-9	4,4'-DDE	1.4E-03 J	1.3E-02 J	MG/KG	CAS04-SD09-1209A	4/5	0.0041 - 0.0059	1.3E-02	N/A	1.4E+01 C	N/A	N/A	NO	BSL
	50-29-3	4,4'-DDT	8.3E-04 J	4.3E-02 J	MG/KG	CAS04-SD08-1209A	5/5	0.0041 - 0.0059	4.3E-02	N/A	1.7E+01 C*	N/A	N/A	NO	BSL
	309-00-2	Aldrin	1.0E-03 J	1.0E-03 J	MG/KG	CAS04-SD08-1209A	1/5	0.0021 - 0.003	1.0E-03	N/A	2.9E-01 C*	N/A	N/A	NO	BSL
	53469-21-9	Aroclor-1242	2.0E-02 J	5.2E-02 J	MG/KG	CAS04-SD06-1209A	2/5	0.022 - 0.032	5.2E-02	N/A	2.2E+00 C	N/A	N/A	NO	BSL
	11097-69-1	Aroclor-1254	3.3E-01	3.3E-01	MG/KG	CAS04-SD05-1209A	1/5	0.021 - 0.03	3.3E-01	N/A	1.1E+00 C**	N/A	N/A	NO	BSL
	11096-82-5	Aroclor-1260	2.3E-02	3.2E-01	MG/KG	CAS04-SD05-1209A	4/5	0.022 - 0.032	3.2E-01	N/A	2.2E+00 C	N/A	N/A	NO	BSL
	959-98-8	Endosulfan I	1.3E-03 J	9.4E-03 J	MG/KG	CAS04-SD05-1209A	2/5	0.0021 - 0.003	9.4E-03	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	33213-65-9	Endosulfan II	6.4E-04 J	9.4E-03 J	MG/KG	CAS04-SD05-1209A	5/5	0.0041 - 0.0059	9.4E-03	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	1031-07-8	Endosulfan sulfate	3.4E-03 J	1.8E-02 J	MG/KG	CAS04-SD08-1209A	2/5	0.0041 - 0.0059	1.8E-02	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	7421-93-4	Endrin aldehyde	1.3E-02 J	1.3E-02 J	MG/KG	CAS04-SD05-1209A	1/5	0.0041 - 0.0059	1.3E-02	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	58-89-9	gamma-BHC (Lindane)	7.8E-04 J	7.8E-04 J	MG/KG	CAS04-SD06-1209A	1/5	0.0021 - 0.003	7.8E-04	N/A	5.2E+00 C*	N/A	N/A	NO	BSL
	5103-74-2	gamma-Chlordane	1.4E-03 J	1.2E-02 J	MG/KG	CAS04-SD05-1209A	4/5	0.0021 - 0.003	1.2E-02	N/A	1.6E+01 C*	N/A	N/A	NO	BSL
	76-44-8	Heptachlor	1.7E-03 J	1.7E-03 J	MG/KG	CAS04-SD05-1209A	1/5	0.0021 - 0.003	1.7E-03	N/A	1.1E+00 C	N/A	N/A	NO	BSL
	7429-90-5	Aluminum	5.5E+03	1.2E+04	MG/KG	CAS04-SD07P-1209A	5/5	22 - 44	1.2E+04	N/A	7.7E+04 N	N/A	N/A	NO	BSL
	7440-38-2	**Arsenic**	**2.5E+00 L**	**1.0E+01 L**	**MG/KG**	**CAS04-SD09-1209A**	**5/5**	**0.6 - 1.2**	**1.0E+01**	**N/A**	**3.9E+00 C***	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-39-3	Barium	1.7E+01	3.2E+01	MG/KG	CAS04-SD05-1209A	5/5	0.37 - 0.74	3.2E+01	N/A	1.5E+04 N	N/A	N/A	NO	BSL
	7440-41-7	Beryllium	3.4E-01 J	6.5E-01	MG/KG	CAS04-SD07-1209A	5/5	0.37 - 0.74	6.5E-01	N/A	1.6E+02 N	N/A	N/A	NO	BSL
	7440-43-9	Cadmium	1.6E-01	6.5E-01	MG/KG	CAS04-SD08-1209A	5/5	0.074 - 0.15	6.5E-01	N/A	7.0E+01 N	N/A	N/A	NO	BSL
	7440-70-2	Calcium	2.3E+03	1.2E+04	MG/KG	CAS04-SD08-1209A	5/5	4.7 - 9.3	1.2E+04	N/A	N/A	N/A	N/A	NO	NUT
	7440-47-3	**Chromium**	**9.4E+00 L**	**2.7E+01 L**	**MG/KG**	**CAS04-SD07-1209A**	**5/5**	**1.1 - 2.2**	**2.7E+01**	**N/A**	**2.9E+00 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**

Table 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Sediment (0-4")
Exposure Medium: Surface Sediment (0-4")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-48-4	Cobalt	1.3E+00 J	2.7E+00	MG/KG	CAS04-SD05-1209A; CAS04-SD07-1209A	5/5	2.2 - 4.4	2.7E+00	N/A	2.3E+01 N	N/A	N/A	NO	BSL
	7440-50-8	Copper	3.5E+00 J	2.5E+01 J	MG/KG	CAS04-SD08-1209A	5/5	0.24 - 0.49	2.5E+01	N/A	3.1E+03 N	N/A	N/A	NO	BSL
	7439-89-6	Iron	6.4E+03	1.4E+04	MG/KG	CAS04-SD08-1209A	5/5	7.4 - 15	1.4E+04	N/A	5.5E+04 N	N/A	N/A	NO	BSL
	7439-92-1	Lead	5.7E+00	1.8E+01	MG/KG	CAS04-SD05-1209A	5/5	0.37 - 0.74	1.8E+01	N/A	4.0E+02 NL	N/A	N/A	NO	BSL
	7439-95-4	Magnesium	5.5E+02	1.8E+03	MG/KG	CAS04-SD08-1209A	5/5	3.7 - 7.4	1.8E+03	N/A	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	2.0E+01	6.2E+01	MG/KG	CAS04-SD08-1209A	5/5	0.37 - 0.74	6.2E+01	N/A	1.8E+03 N	N/A	N/A	NO	BSL
	7439-97-6	Mercury	1.0E-02 J	1.2E-01	MG/KG	CAS04-SD05-1209A	5/5	0.034 - 0.054	1.2E-01	N/A	2.3E+01 N	N/A	N/A	NO	BSL
	7440-02-0	Nickel	2.9E+00 J	7.4E+00	MG/KG	CAS04-SD07P-1209A	5/5	3 - 5.9	7.4E+00	N/A	1.5E+03 N	N/A	N/A	NO	BSL
	7440-09-7	Potassium	5.0E+02 K	1.9E+03 K	MG/KG	CAS04-SD07P-1209A	5/5	74 - 150	1.9E+03	N/A	N/A	N/A	N/A	NO	NUT
	7782-49-2	Selenium	2.5E-01 J	8.7E-01 J	MG/KG	CAS04-SD05-1209A	4/5	0.74 - 1.5	8.7E-01	N/A	3.9E+02 N	N/A	N/A	NO	BSL
	7440-23-5	Sodium	1.4E+02	1.4E+02	MG/KG	CAS04-SD08-1209A	1/5	74 - 150	1.4E+02	N/A	N/A	N/A	N/A	NO	NUT
	7440-28-0	Thallium	5.0E-01 J	5.0E-01 J	MG/KG	CAS04-SD09-1209A	1/5	1.1 - 2.2	5.0E-01	N/A	N/A	N/A	N/A	NO	NTX
	7440-62-2	Vanadium	1.2E+01	3.1E+01	MG/KG	CAS04-SD07P-1209A	5/5	1.9 - 3.7	3.1E+01	N/A	3.9E+02 N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	2.0E+01	6.5E+01	MG/KG	CAS04-SD08-1209A	5/5	1.9 - 3.7	6.5E+01	N/A	2.3E+04 N	N/A	N/A	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs adjusted by 10 for carcinogens (based on 10^{-7} for carcinogens and HQ of 1.0 for noncarcinogens). Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde.
[5] Rationale Codes

Selection Reason: Above Regional Screening Level (ASL-RSL)
No Toxicity Information (NTX), not quantified
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level

TABLE 2.6a

Step 2 Sediment Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Sediment (0 - 4 inch), Drainage Ditches

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)pyrene	4 / 5	3.8E-01	CAS04-SD05-1209A	1.5E-02	1E-06	NA	3E-05	NA
Metals (mg/kg)								
Arsenic	5 / 5	1.0E+01 L	CAS04-SD09-1209A	3.9E-01	1E-06	NA	3E-05	NA
Chromium	5 / 5	2.7E+01 L	CAS04-SD07-1209A	2.9E-01	1E-06	NA	9E-05	NA
Cumulative Corresponding Hazard Index[c]						**NA**		
Cumulative Corresponding Cancer Risk[d]							**1E-04**	

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

L = Biased Low

mg/kg = Milligram per kilogram

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.6b

Step 3 Sediment Screening - Risk Ratio, 95% UCL

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Sediment (0 - 4 inch), Drainage Ditches

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Volatile Organic Compounds (mg/kg)									
Benzo(a)pyrene	4 / 5	3.8E-01	Max	6	1.5E-02	1E-06	NA	3E-05	NA
Metals (mg/kg)									
Arsenic	5 / 5	8.2E+00	95% Stud-t	1, 2, 3	3.9E-01	1E-06	NA	2E-05	NA
Chromium	5 / 5	2.3E+01	95% Stud-t	1, 2, 3	2.9E-01	1E-06	NA	8E-05	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**1E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram

HI = Hazard Index

NA = Not available/not applicable

RSL = Regional Screening Levels

UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max); 95% Student's-T test UCL (95% Stud-t).

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

(7) The maximum detected concentration was used as the UCL because there too few distinct values.

Table 2.7
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Subsurface Sediment (4-8")
Exposure Medium: Subsurface Sediment (4-8")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Sediment (4 - 8")	78-93-3	2-Butanone	1.4E-02 J	2.6E-02 J	MG/KG	CAS04-SD06-1209B	3/5	0.028 - 0.036	2.6E-02	N/A	2.8E+04 N	N/A	N/A	NO	BSL
Site 4	67-64-1	Acetone	8.7E-02 J	1.3E-01 J	MG/KG	CAS04-SD06-1209B	3/5	0.028 - 0.036	1.3E-01	N/A	6.1E+04 N	N/A	N/A	NO	BSL
Drainage Ditches	75-15-0	Carbon disulfide	1.0E-03 J	1.0E-03 J	MG/KG	CAS04-SD06-1209B	1/5	0.006 - 0.007	1.0E-03	N/A	7.38E+02 NS	N/A	N/A	NO	BSL
	127-18-4	Tetrachloroethene	2.0E-03 J	1.7E-02 J	MG/KG	CAS04-SD06-1209B	4/5	0.006 - 0.007	1.7E-02	N/A	5.5E+00 C	N/A	N/A	NO	BSL
	83-32-9	Acenaphthene	3.5E-03 J	3.5E-03 J	MG/KG	CAS04-SD05-1209B	1/5	0.024 - 0.03	3.5E-03	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	208-96-8	Acenaphthylene	1.0E-02 J	1.0E-02 J	MG/KG	CAS04-SD05-1209B	1/5	0.024 - 0.03	1.0E-02	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	120-12-7	Anthracene	1.1E-02 J	1.1E-02 J	MG/KG	CAS04-SD05-1209B	1/5	0.024 - 0.03	1.1E-02	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	56-55-3	Benzo(a)anthracene	1.3E-01	1.3E-01	MG/KG	CAS04-SD05-1209B	1/5	0.024 - 0.03	1.3E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	50-32-8	Benzo(a)pyrene	6.0E-03 J	1.3E-01	MG/KG	CAS04-SD05-1209B	4/5	0.024 - 0.03	1.3E-01	N/A	1.5E-01 C	N/A	N/A	NO	BSL
	205-99-2	Benzo(b)fluoranthene	2.2E-01	2.2E-01	MG/KG	CAS04-SD05-1209B	1/5	0.024 - 0.03	2.2E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	191-24-2	Benzo(g,h,i)perylene	8.6E-03 L	5.6E-02 L	MG/KG	CAS04-SD05-1209B	2/5	0.024 - 0.03	5.6E-02	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	207-08-9	Benzo(k)fluoranthene	4.2E-03 J	4.6E-02	MG/KG	CAS04-SD05-1209B	3/5	0.024 - 0.03	4.6E-02	N/A	1.5E+01 C	N/A	N/A	NO	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	8.9E-02 J	1.0E-01 J	MG/KG	CAS04-SD05-1209B	2/5	0.12 - 0.15	1.0E-01	N/A	3.5E+02 C*	N/A	N/A	NO	BSL
	86-74-8	Carbazole	6.5E-03 J	9.6E-03 J	MG/KG	CAS04-SD05-1209B	4/5	0.024 - 0.03	9.6E-03	N/A	N/A	N/A	N/A	NO	NTX
	218-01-9	Chrysene	5.5E-03 J	1.3E-01	MG/KG	CAS04-SD05-1209B	2/5	0.024 - 0.03	1.3E-01	N/A	1.5E+02 C	N/A	N/A	NO	BSL
	53-70-3	Dibenz(a,h)anthracene	1.2E-02 J	4.8E-02	MG/KG	CAS04-SD05-1209B	3/5	0.024 - 0.03	4.8E-02	N/A	1.5E-01 C	N/A	N/A	NO	BSL
	206-44-0	Fluoranthene	1.0E-02 J	2.5E-01	MG/KG	CAS04-SD05-1209B	4/5	0.024 - 0.03	2.5E-01	N/A	2.3E+03 N	N/A	N/A	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	8.1E-03 J	1.1E-01	MG/KG	CAS04-SD05-1209B	4/5	0.024 - 0.03	1.1E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	87-86-5	Pentachlorophenol	1.9E-02 J	1.9E-02 J	MG/KG	CAS04-SD08-1209B	1/5	0.12 - 0.15	1.9E-02	N/A	3.0E+01 C	N/A	N/A	NO	BSL
	85-01-8	Phenanthrene	5.2E-03 J	1.0E-01	MG/KG	CAS04-SD05-1209B	4/5	0.024 - 0.03	1.0E-01	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	129-00-0	Pyrene	5.3E-03 J	1.9E-01	MG/KG	CAS04-SD05-1209B	4/5	0.024 - 0.03	1.9E-01	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	72-54-8	4,4'-DDD	4.7E-03 J	1.4E-02	MG/KG	CAS04-SD09-1209B	3/5	0.004 - 0.005	1.4E-02	N/A	2.0E+01 C	N/A	N/A	NO	BSL
	72-55-9	4,4'-DDE	2.0E-03 J	5.0E-03	MG/KG	CAS04-SD09-1209B	3/5	0.004 - 0.005	5.0E-03	N/A	1.4E+01 C	N/A	N/A	NO	BSL
	50-29-3	4,4'-DDT	1.3E-03 J	1.2E-01 J	MG/KG	CAS04-SD08-1209B	3/5	0.0041 - 0.02	1.2E-01	N/A	1.7E+01 C*	N/A	N/A	NO	BSL
	11097-69-1	Aroclor-1254	6.3E-02	6.3E-02	MG/KG	CAS04-SD05-1209B	1/5	0.021 - 0.026	6.3E-02	N/A	1.1E+00 C**	N/A	N/A	NO	BSL
	11096-82-5	Aroclor-1260	3.0E-02	7.2E-02	MG/KG	CAS04-SD05-1209B	2/5	0.022 - 0.028	7.2E-02	N/A	2.2E+00 C	N/A	N/A	NO	BSL
	60-57-1	Dieldrin	3.3E-03 J	3.3E-03 J	MG/KG	CAS04-SD09-1209B	1/5	0.004 - 0.005	3.3E-03	N/A	3.0E-01 C	N/A	N/A	NO	BSL
	959-98-8	Endosulfan I	6.3E-04 J	2.7E-03 J	MG/KG	CAS04-SD05-1209B	2/5	0.0021 - 0.0026	2.7E-03	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	33213-65-9	Endosulfan II	2.2E-03 J	2.2E-03 J	MG/KG	CAS04-SD05-1209B	1/5	0.004 - 0.005	2.2E-03	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	1031-07-8	Endosulfan sulfate	2.0E-03 J	2.0E-03 J	MG/KG	CAS04-SD08-1209B	1/5	0.004 - 0.005	2.0E-03	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	7421-93-4	Endrin aldehyde	3.6E-03 J	3.6E-03 J	MG/KG	CAS04-SD05-1209B	1/5	0.004 - 0.005	3.6E-03	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	5103-74-2	gamma-Chlordane	2.8E-03 J	2.8E-03 J	MG/KG	CAS04-SD05-1209B	1/5	0.0021 - 0.0026	2.8E-03	N/A	1.6E+01 C*	N/A	N/A	NO	BSL
	7429-90-5	Aluminum	3.2E+03	2.9E+04 J	MG/KG	CAS04-SD07-1209B	5/5	20 - 67	2.9E+04	N/A	7.7E+04 N	N/A	N/A	NO	BSL
	7440-38-2	**Arsenic**	**2.3E+00 L**	**1.3E+01 L**	**MG/KG**	**CAS04-SD09-1209B**	**5/5**	**0.52 - 1.8**	**1.3E+01**	**N/A**	**3.9E+00 C***	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-39-3	Barium	9.6E+00	6.8E+01 J	MG/KG	CAS04-SD07-1209B	5/5	0.32 - 1.1	6.8E+01	N/A	1.5E+04 N	N/A	N/A	NO	BSL
	7440-41-7	Beryllium	2.1E-01 J	1.8E+00 J	MG/KG	CAS04-SD07-1209B	5/5	0.32 - 1.1	1.8E+00	N/A	1.6E+02 N	N/A	N/A	NO	BSL

Table 2.7
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Subsurface Sediment (4-8")
Exposure Medium: Subsurface Sediment (4-8")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration	Qualifier	Maximum [1] Concentration	Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-43-9	Cadmium	7.0E-02	J	1.4E+00	J	MG/KG	CAS04-SD07-1209B	5/5	0.065 - 0.22	1.4E+00	N/A	7.0E+01	N	N/A	N/A	NO	BSL
	7440-70-2	Calcium	2.6E+03		2.0E+04		MG/KG	CAS04-SD08-1209B	5/5	4.1 - 14	2.0E+04	N/A	N/A		N/A	N/A	NO	NUT
	7440-47-3	**Chromium**	**1.1E+01**	**L**	**7.2E+01**	**L**	**MG/KG**	**CAS04-SD07-1209B**	**5/5**	**0.98 - 3.4**	**7.2E+01**	**N/A**	**2.9E+00**	**C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-48-4	Cobalt	8.0E-01	J	6.8E+00	J	MG/KG	CAS04-SD07-1209B	5/5	2 - 6.7	6.8E+00	N/A	2.3E+01	N	N/A	N/A	NO	BSL
	7440-50-8	Copper	2.5E+00	J	5.9E+00	J	MG/KG	CAS04-SD05-1209B	5/5	0.21 - 0.42	5.9E+00	N/A	3.1E+03	N	N/A	N/A	NO	BSL
	7439-89-6	Iron	4.3E+03		2.8E+04	J	MG/KG	CAS04-SD07-1209B	5/5	6.5 - 22	2.8E+04	N/A	5.5E+04	N	N/A	N/A	NO	BSL
	7439-92-1	Lead	3.4E+00		1.4E+01		MG/KG	CAS04-SD07-1209B	5/5	0.32 - 1.1	1.4E+01	N/A	4.0E+02	NL	N/A	N/A	NO	BSL
	7439-95-4	Magnesium	7.8E+02		4.1E+03		MG/KG	CAS04-SD07-1209B	5/5	3.2 - 11	4.1E+03	N/A	N/A		N/A	N/A	NO	NUT
	7439-96-5	Manganese	1.6E+01		5.0E+01		MG/KG	CAS04-SD07-1209B	5/5	0.32 - 1.1	5.0E+01	N/A	1.8E+03	N	N/A	N/A	NO	BSL
	7439-97-6	Mercury	1.0E-02	J	5.0E-02		MG/KG	CAS04-SD05-1209B	4/5	0.04 - 0.12	5.0E-02	N/A	2.3E+01	N	N/A	N/A	NO	BSL
	7440-02-0	Nickel	2.7E+00	J	2.1E+01		MG/KG	CAS04-SD07-1209B	5/5	2.6 - 9	2.1E+01	N/A	1.5E+03	N	N/A	N/A	NO	BSL
	7440-09-7	Potassium	8.4E+02	K	4.7E+03	K	MG/KG	CAS04-SD07-1209B	5/5	65 - 220	4.7E+03	N/A	N/A		N/A	N/A	NO	NUT
	7782-49-2	Selenium	3.9E-01	J	4.0E-01	J	MG/KG	CAS04-SD05-1209B	2/5	0.65 - 2.2	4.0E-01	N/A	3.9E+02	N	N/A	N/A	NO	BSL
	7440-23-5	Sodium	2.1E+02		2.1E+02		MG/KG	CAS04-SD08-1209B	1/5	65 - 220	2.1E+02	N/A	N/A		N/A	N/A	NO	NUT
	7440-62-2	Vanadium	1.2E+01		8.2E+01		MG/KG	CAS04-SD07-1209B	5/5	1.6 - 5.6	8.2E+01	N/A	3.9E+02	N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	1.1E+01		5.4E+01	J	MG/KG	CAS04-SD07-1209B	5/5	1.6 - 5.6	5.4E+01	N/A	2.3E+04	N	N/A	N/A	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs adjusted by 10 for carcinogens (based on 10^{-7} for carcinogens and HQ of 1.0 for noncarcinogens).
Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde.
[5] Rationale Codes
Selection Reason: Above Regional Screening Level (ASL-RSL)
No Toxicity Information (NTX), not quantified
Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level

TABLE 2.7a

Step 2 Sediment Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 4 - Sediment (4 - 8 inches), Drainage Ditches

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Metals (mg/kg)								
Arsenic	5 / 5	1.3E+01 L	CAS04-SD09-1209B	3.9E-01	1E-06	NA	3E-05	NA
Chromium	5 / 5	7.2E+01 L	CAS04-SD07-1209B	2.9E-01	1E-06	NA	2E-04	NA
Cumulative Corresponding Hazard Index[c]						**NA**		
Cumulative Corresponding Cancer Risk[d]							**3E-04**	

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

L = Biased Low

mg/kg = Milligram per kilogram

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.7b
Step 3 Sediment Screening - Risk Ratio, 95% UCL
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site 4 - Sediment (4 - 8 inches), Drainage Ditches

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Metals (mg/kg)									
Arsenic	5 / 5	1.1E+01	95% Stud-t	1, 2, 3	3.9E-01	1E-06	NA	3E-05	NA
Chromium	5 / 5	7.0E+01	G-App	1, 3	2.9E-01	1E-06	NA	2E-04	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**3E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.
[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.
[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen
[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent
Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,
Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram
HI = Hazard Index
NA = Not available/not applicable
RSL = Regional Screening Levels
UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations
in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).
Options: Approximate Gamma UCL (G-App); 95% Student's-T test UCL (95% Stud-t).

UCL Rationale:
(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.
(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) Maximum detected concentration because sample set less than 5 samples.
(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.
(7) The maximum detected concentration was used as the UCL because there too few distinct values.

Attachment A.2
Site 9

Table 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 9
Cheatham Annex, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Surface Soil	67-64-1	Acetone	1.4E-01	1.4E-01	MG/KG	CAS09-SS05-1109	1/5	0.022 - 0.027	1.4E-01	N/A	N/A	6.1E+03 N	NO	4.50E+00	NO	BSL
Site 9	75-09-2	Methylene chloride	9.0E-03 J	5.0E-02	MG/KG	CAS09-SS05P-1109	3/5	0.022 - 0.027	5.0E-02	N/A	N/A	1.1E+01 C	NO	1.20E-03	YES	ASL-SSL
	108-88-3	Toluene	2.0E-03 J	2.0E-03 J	MG/KG	CAS09-SS01-1009	1/5	0.004 - 0.005	2.0E-03	N/A	N/A	5.0E+02 NS	NO	1.60E+00	NO	BSL
	83-32-9	Acenaphthene	1.7E-03 J	1.7E-03 J	MG/KG	CAS09-SS02-1109	1/5	0.02 - 0.022	1.7E-03	N/A	N/A	3.4E+02 N	NO	2.20E+01	NO	BSL
	208-96-8	Acenaphthylene	1.2E-03 J	1.2E-03 J	MG/KG	CAS09-SS02-1109	1/5	0.02 - 0.022	1.2E-03	N/A	N/A	3.4E+02 N	NO	N/A	N/A	BSL
	120-12-7	Anthracene	2.1E-03 J	6.5E-03 J	MG/KG	CAS09-SS02-1109	2/5	0.02 - 0.022	6.5E-03	N/A	N/A	1.7E+03 N	NO	3.60E+02	NO	BSL
	56-55-3	Benzo(a)anthracene	3.4E-03 J	4.0E-02	MG/KG	CAS09-SS02-1109	4/5	0.02 - 0.022	4.0E-02	N/A	N/A	1.5E-01 C	NO	1.00E-02	YES	ASL-SSL
	50-32-8	**Benzo(a)pyrene**	**3.9E-03 J**	**3.9E-02**	**MG/KG**	**CAS09-SS02-1109**	**3/5**	**0.02 - 0.022**	**3.9E-02**	**N/A**	**N/A**	**1.5E-02 C**	**YES**	**3.50E-03**	**YES**	**ASL-RSL, ASL-SSL**
	205-99-2	Benzo(b)fluoranthene	5.5E-03 J	6.1E-02	MG/KG	CAS09-SS02-1109	4/5	0.02 - 0.022	6.1E-02	N/A	N/A	1.5E-01 C	NO	3.50E-02	YES	ASL-SSL
	191-24-2	Benzo(g,h,i)perylene	2.5E-03 J	1.5E-02 J	MG/KG	CAS09-SS02-1109	3/5	0.02 - 0.022	1.5E-02	N/A	N/A	1.7E+02 N	NO	N/A	N/A	BSL
	207-08-9	Benzo(k)fluoranthene	6.9E-03 J	2.4E-02	MG/KG	CAS09-SS02-1109	2/5	0.02 - 0.022	2.4E-02	N/A	N/A	1.5E+00 C	NO	3.50E-01	NO	BSL
	86-74-8	Carbazole	2.7E-03 J	2.7E-03 J	MG/KG	CAS09-SS02-1109	1/5	0.02 - 0.022	2.7E-03	N/A	N/A	N/A	N/A	N/A	N/A	NTX
	218-01-9	Chrysene	4.6E-03 J	4.3E-02	MG/KG	CAS09-SS02-1109	4/5	0.02 - 0.022	4.3E-02	N/A	N/A	1.5E+01 C	NO	1.10E+00	NO	BSL
	53-70-3	Dibenz(a,h)anthracene	5.0E-03 J	5.0E-03 J	MG/KG	CAS09-SS02-1109	1/5	0.02 - 0.022	5.0E-03	N/A	N/A	1.5E-02 C	NO	1.10E-02	NO	BSL
	206-44-0	Fluoranthene	7.1E-03 J	8.1E-02	MG/KG	CAS09-SS02-1109	4/5	0.02 - 0.022	8.1E-02	N/A	N/A	2.3E+02 N	NO	1.60E+02	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	4.0E-03 J	4.1E-02	MG/KG	CAS09-SS02-1109	4/5	0.02 - 0.022	4.1E-02	N/A	N/A	1.5E-01 C	NO	1.20E-01	NO	BSL
	85-01-8	Phenanthrene	3.3E-03 J	3.2E-02	MG/KG	CAS09-SS02-1109	4/5	0.02 - 0.022	3.2E-02	N/A	N/A	1.7E+03 N	NO	N/A	N/A	BSL
	129-00-0	Pyrene	7.5E-03 J	6.9E-02	MG/KG	CAS09-SS02-1109	4/5	0.02 - 0.022	6.9E-02	N/A	N/A	1.7E+02 N	NO	1.20E+02	NO	BSL
	72-54-8	4,4'-DDD	6.7E-03 J	6.7E-03 J	MG/KG	CAS09-SS03-1109	1/5	0.0031 - 0.0036	6.7E-03	N/A	N/A	2.0E+00 C	NO	6.60E-02	NO	BSL
	72-55-9	4,4'-DDE	5.8E-03 J	5.8E-03 J	MG/KG	CAS09-SS02-1109	1/5	0.0031 - 0.0036	5.8E-03	N/A	N/A	1.4E+00 C	NO	4.70E-02	NO	BSL
	50-29-3	4,4'-DDT	8.0E-03 J	5.9E-02 J	MG/KG	CAS09-SS02-1109	3/5	0.0031 - 0.0036	5.9E-02	N/A	N/A	1.7E+00 C*	NO	6.70E-02	NO	BSL
	5103-71-9	alpha-Chlordane	4.8E-04 J	4.8E-04 J	MG/KG	CAS09-SS02-1109	1/5	0.0016 - 0.0019	4.8E-04	N/A	N/A	1.6E+00 C*	NO	1.30E-02	NO	BSL
	11096-82-5	**Aroclor-1260**	**9.5E-03 J**	**7.6E-01**	**MG/KG**	**CAS09-SS02-1109**	**13/18**	**0.01 - 0.321**	**7.6E-01**	**N/A**	**N/A**	**2.2E-01 C**	**YES**	**2.40E-02**	**YES**	**ASL-RSL, ASL-SSL**
	60-57-1	Dieldrin	1.6E-03 J	1.1E-02 J	MG/KG	CAS09-SS02-1109	2/5	0.0031 - 0.0036	1.1E-02	N/A	N/A	3.0E-02 C	NO	1.70E-04	YES	ASL-SSL
	959-98-8	Endosulfan I	1.0E-03 J	1.0E-03 J	MG/KG	CAS09-SS02-1109	1/5	0.0016 - 0.0019	1.0E-03	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	33213-65-9	Endosulfan II	1.1E-03 J	1.0E-02 J	MG/KG	CAS09-SS02-1109	4/5	0.0031 - 0.0036	1.0E-02	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	1031-07-8	Endosulfan sulfate	4.6E-03 J	3.0E-02 J	MG/KG	CAS09-SS02-1109	3/5	0.0031 - 0.0036	3.0E-02	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	58-89-9	gamma-BHC (Lindane)	6.3E-04 J	6.3E-04 J	MG/KG	CAS09-SS04-1109	1/5	0.0016 - 0.0019	6.3E-04	N/A	N/A	5.2E-01 C*	NO	3.60E-04	YES	ASL-SSL
	5103-74-2	gamma-Chlordane	9.1E-04 J	7.6E-03 J	MG/KG	CAS09-SS02-1109	3/5	0.0016 - 0.0019	7.6E-03	N/A	N/A	1.6E+00 C*	NO	1.30E-02	NO	BSL
	7429-90-5	**Aluminum**	**4.5E+03**	**1.3E+04**	**MG/KG**	**CAS09-SS05P-1109**	**5/5**	**24 - 30**	**1.3E+04**	**1.2E+04**	**YES**	**7.7E+03 N**	**YES**	**5.50E+04**	**NO**	**ASL-RSL**
	7440-36-0	Antimony	6.0E-02 L	2.0E-01 L	MG/KG	CAS09-SS02-1109	5/5	0.079 - 0.1	2.0E-01	1.1E+01	NO	3.1E+00 N	N/A	6.60E-01	N/A	BBK
	7440-38-2	Arsenic	9.1E-01	2.4E+00	MG/KG	CAS09-SS05P-1109	5/5	0.39 - 0.51	2.4E+00	6.4E+00	NO	3.9E-01 C*	N/A	1.30E-03	N/A	BBK
	7440-39-3	Barium	2.3E+01	9.7E+01	MG/KG	CAS09-SS04-1109	5/5	0.39 - 0.51	9.7E+01	5.3E+01	YES	1.5E+03 N	NO	3.00E+02	NO	BSL
	7440-41-7	Beryllium	2.5E-01 J	9.4E-01	MG/KG	CAS09-SS02-1109	5/5	0.39 - 0.51	9.4E-01	5.9E-01	YES	1.6E+01 N	NO	5.80E+01	NO	BSL
	7440-43-9	Cadmium	3.0E-02 J	1.0E+00	MG/KG	CAS09-SS02-1109	4/5	0.79 - 1	1.0E+00	1.5E+00	NO	7.0E+00 N	N/A	1.40E+00	N/A	BBK
	7440-70-2	Calcium	5.4E+02	5.5E+03	MG/KG	CAS09-SS02-1109	5/5	5.5 - 7.1	5.5E+03	2.3E+03	YES	N/A	NUT	N/A	NUT	NUT
	7440-47-3	**Chromium**	**5.9E+00 K**	**1.9E+01 K**	**MG/KG**	**CAS09-SS05P-1109**	**5/5**	**1.2 - 1.5**	**1.9E+01**	**1.8E+01**	**YES**	**2.9E-01 C**	**YES**	**8.30E-04**	**YES**	**ASL-RSL, ASL-SSL**
	7440-48-4	Cobalt	1.0E+00	4.3E+00	MG/KG	CAS09-SS02-1109	5/5	0.079 - 0.1	4.3E+00	9.9E+00	NO	2.3E+00 N	N/A	4.90E-01	N/A	BBK
	7440-50-8	**Copper**	**3.8E+00 K**	**5.1E+02 K**	**MG/KG**	**CAS09-SS02-1109**	**5/5**	**2 - 2.5**	**5.1E+02**	**4.3E+00**	**YES**	**3.1E+02 N**	**YES**	**5.10E+01**	**YES**	**ASL-RSL, ASL-SSL**
	57-12-5	Cyanide	2.8E-01 J	2.8E-01 J	MG/KG	CAS09-SS01-1009	1/5	0.77 - 0.84	2.8E-01	ND	YES	1.6E+02 N	NO	7.40E+00	NO	BSL

Table 2.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 9

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	7439-89-6	Iron	4.5E+03	1.4E+04	MG/KG	CAS09-SS02-1109	5/5	7.9 - 10	1.4E+04	2.0E+04	NO	5.5E+03 N	N/A	6.40E+02	N/A	BBK
	7439-92-1	Lead	6.0E+00 K	3.9E+01 K	MG/KG	CAS09-SS02-1109	5/5	0.39 - 0.51	3.9E+01	1.7E+01	YES	4.0E+02 NL	NO	N/A	N/A	BSL
	7439-95-4	Magnesium	3.3E+02 K	3.6E+03 K	MG/KG	CAS09-SS02-1109	5/5	3.9 - 5.1	3.6E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	Manganese	4.8E+01 K	3.0E+02 K	MG/KG	CAS09-SS02-1109	5/5	0.39 - 0.51	3.0E+02	3.2E+02	NO	1.8E+02 N	N/A	5.70E+01	N/A	BBK
	7439-97-6	Mercury	1.0E-02 J	2.0E-02 J	MG/KG	CAS09-SS02-1109, CAS09-SS04-1109	4/5	0.033 - 0.037	2.0E-02	1.1E-01	NO	2.3E+00 N	N/A	3.00E-02	N/A	BBK
	7440-02-0	Nickel	2.3E+00 J	4.5E+01 J	MG/KG	CAS09-SS02-1109	5/5	3.2 - 4.1	4.5E+01	9.5E+00	YES	1.5E+02 N	NO	4.80E+01	NO	BSL
	7440-09-7	Potassium	2.3E+02 K	2.0E+03 K	MG/KG	CAS09-SS04-1109	5/5	79 - 100	2.0E+03	7.1E+02	YES	N/A	NUT	N/A	NUT	NUT
	7782-49-2	Selenium	9.0E-02 J	3.0E-01 J	MG/KG	CAS09-SS05P-1109	5/5	0.39 - 0.51	3.0E-01	5.1E-01	NO	3.9E+01 N	N/A	9.50E-01	N/A	BBK
	7440-22-4	Silver	7.0E-02 J	1.3E-01 J	MG/KG	CAS09-SS02-1109	2/5	1.2 - 1.5	1.3E-01	2.1E+00	NO	3.9E+01 N	N/A	1.60E+00	N/A	BBK
	7440-23-5	Sodium	1.7E+01 K	8.4E+01 K	MG/KG	CAS09-SS02-1109	5/5	79 - 100	8.4E+01	5.2E+02	NO	N/A	N/A	N/A	N/A	BBK
	7440-62-2	Vanadium	8.1E+00	2.4E+01	MG/KG	CAS09-SS05P-1109	5/5	0.39 - 0.51	2.4E+01	2.8E+01	NO	3.9E+01 N	N/A	1.80E+02	N/A	BBK
	7440-66-6	Zinc	8.0E+00 K	1.2E+02 K	MG/KG	CAS09-SS04-1109	5/5	2 - 2.5	1.2E+02	2.7E+01	YES	2.3E+03 N	NO	6.80E+02	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximum concentrations were compared to background concentrations. If exceedances, the maximum concentrations were then compared to RSLs and SSLs.

[4] Background values from CAX/Yorktown surface soil background soil; values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.

[6] Risk-based Soil Screening Levels. ORNL. May 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml

[7] Rationale Codes

Selection Reason: Above Regional Screening Level (ASL-RSL)
Above Soil Screening Level (ASL-SSL), not evaluated quantitatively
No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels

TABLE 2.1a

Step 2 Surface Soil Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex, Williamsburg, Virginia

Site 9 - Surface Soil

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)pyrene	3 / 5	3.9E-02	CAS09-SS02-1109	1.5E-02	1E-06	NA	3E-06	NA
Pesticides/PCBs (mg/kg)								
Aroclor-1260	13 / 18	7.6E-01	CAS09-SS02-1109	2.2E-01	1E-06	NA	3E-06	NA
Metals (mg/kg)								
Aluminum	5 / 5	1.3E+04	CAS09-SS05P-1109	7.7E+04	1	0.2	NA	Developmental, Neurological
Chromium	5 / 5	1.9E+01 K	CAS09-SS05P-1109	2.9E-01	0.000001	NA	6E-05	NA
Copper	5 / 5	5.1E+02 K	CAS09-SS02-1109	3.1E+03	1	0.2	NA	Gastrointestinal
Cumulative Corresponding Hazard Index[c]						**0.3**		
Cumulative Corresponding Cancer Risk[d]							**7E-05**	

Total Developmental HI =	0.2
Total Neurological HI =	0.2
Total Gastrointestinal HI =	0.2

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

K = Biased High

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Level

Table 2.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 9

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Subsurface Soil	67-64-1	Acetone	8.6E-02	9.3E-02 J	MG/KG	CAS09-SB01-1009	2/5	0.022 - 0.025	9.3E-02	N/A	N/A	6.1E+03 N	NO	4.50E+00	NO	BSL
Site 9	75-09-2	Methylene chloride	5.4E-02	5.4E-02	MG/KG	CAS09-SB05P-1109	1/5	0.022 - 0.025	5.4E-02	N/A	N/A	1.1E+01 C	NO	1.20E-03	YES	ASL-SSL
	108-88-3	Toluene	2.0E-03 J	2.0E-03 J	MG/KG	CAS09-SB01-1009, CAS09-SB03-1109, CAS09-SB04-1109	3/5	0.004 - 0.005	2.0E-03	N/A	N/A	5.0E+02 NS	NO	1.60E+00	NO	BSL
	56-55-3	Benzo(a)anthracene	4.8E-03 J	4.8E-03 J	MG/KG	CAS09-SB05-1109	1/5	0.019 - 0.023	4.8E-03	N/A	N/A	1.5E-01 C	NO	1.00E-02	NO	BSL
	50-32-8	Benzo(a)pyrene	4.7E-03 J	4.7E-03 J	MG/KG	CAS09-SB05-1109	1/5	0.019 - 0.023	4.7E-03	N/A	N/A	1.5E-02 C	NO	3.50E-03	YES	ASL-SSL
	205-99-2	Benzo(b)fluoranthene	2.6E-03 J	1.1E-02 J	MG/KG	CAS09-SB04-1109	3/5	0.019 - 0.023	1.1E-02	N/A	N/A	1.5E-01 C	NO	3.50E-02	NO	BSL
	191-24-2	Benzo(g,h,i)perylene	8.8E-03 L	8.8E-03 L	MG/KG	CAS09-SB04-1109	1/5	0.019 - 0.023	8.8E-03	N/A	N/A	1.7E+02 N	NO	N/A	N/A	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	5.9E-02 J	5.9E-02 J	MG/KG	CAS09-SB05-1109	1/5	0.093 - 0.12	5.9E-02	N/A	N/A	3.5E+01 C*	NO	1.10E+00	NO	BSL
	218-01-9	Chrysene	1.9E-03 J	6.4E-03 J	MG/KG	CAS09-SB05-1109	2/5	0.019 - 0.023	6.4E-03	N/A	N/A	1.5E+01 C	NO	1.10E+00	NO	BSL
	53-70-3	Dibenz(a,h)anthracene	1.2E-02 J	1.2E-02 J	MG/KG	CAS09-SB04-1109	1/5	0.019 - 0.023	1.2E-02	N/A	N/A	1.5E-02 C	NO	1.10E-02	YES	ASL-SSL
	206-44-0	Fluoranthene	3.3E-03 J	1.0E-02 J	MG/KG	CAS09-SB05-1109	2/5	0.019 - 0.023	1.0E-02	N/A	N/A	2.3E+02 N	NO	1.60E+02	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	4.8E-03 J	7.6E-03 J	MG/KG	CAS09-SB04-1109	2/5	0.019 - 0.023	7.6E-03	N/A	N/A	1.5E-01 C	NO	1.20E-01	NO	BSL
	85-01-8	Phenanthrene	2.8E-03 J	5.0E-03 J	MG/KG	CAS09-SB05-1109	2/5	0.019 - 0.023	5.0E-03	N/A	N/A	1.7E+03 N	NO	N/A	N/A	BSL
	129-00-0	Pyrene	2.8E-03 J	9.2E-03 J	MG/KG	CAS09-SB05-1109	2/5	0.019 - 0.023	9.2E-03	N/A	N/A	1.7E+02 N	NO	1.20E+02	NO	BSL
	72-54-8	4,4'-DDD	3.1E-03 J	3.1E-03 J	MG/KG	CAS09-SB02-1109	1/5	0.0032 - 0.0038	3.1E-03	N/A	N/A	2.0E+00 C	NO	6.60E-02	NO	BSL
	50-29-3	4,4'-DDT	8.4E-03	8.4E-03	MG/KG	CAS09-SB05-1109	1/5	0.0032 - 0.0038	8.4E-03	N/A	N/A	1.7E+00 C*	NO	6.70E-02	NO	BSL
	11096-82-5	Aroclor-1260	4.1E-02	1.0E-01	MG/KG	CAS09-SB05-1109	2/5	0.017 - 0.021	1.0E-01	N/A	N/A	2.2E-01 C	NO	2.40E-02	YES	ASL-SSL
	60-57-1	Dieldrin	1.4E-03 J	1.4E-03 J	MG/KG	CAS09-SB05-1109	1/5	0.0032 - 0.0038	1.4E-03	N/A	N/A	3.0E-02 C	NO	1.70E-04	YES	ASL-SSL
	33213-65-9	Endosulfan II	7.6E-04 J	1.1E-03 J	MG/KG	CAS09-SB05-1109	2/5	0.0032 - 0.0038	1.1E-03	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	1031-07-8	Endosulfan sulfate	7.6E-04 J	6.4E-03 J	MG/KG	CAS09-SB05-1109	2/5	0.0032 - 0.0038	6.4E-03	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	5103-74-2	gamma-Chlordane	8.4E-04 J	8.4E-04 J	MG/KG	CAS09-SB05-1109	1/5	0.0016 - 0.002	8.4E-04	N/A	N/A	1.6E+00 C*	NO	N/A	N/A	BSL
	7429-90-5	**Aluminum**	**7.2E+03**	**2.7E+04**	**MG/KG**	**CAS09-SB01-1009**	**5/5**	**21 - 34**	**2.7E+04**	**1.3E+04**	**YES**	**7.7E+03 N**	**YES**	**5.50E+04**	**NO**	**ASL-RSL**
	7440-36-0	Antimony	7.0E-02 L	2.2E-01 L	MG/KG	CAS09-SB01-1009	5/5	0.07 - 0.11	2.2E-01	ND	YES	3.1E+00 N	NO	6.60E-01	NO	BSL
	7440-38-2	**Arsenic**	**1.6E+00**	**7.1E+00**	**MG/KG**	**CAS09-SB01-1009**	**5/5**	**0.35 - 0.56**	**7.1E+00**	**5.5E+00**	**YES**	**3.9E-01 C***	**YES**	**1.30E-03**	**YES**	**ASL-RSL, ASL-SSL**
	7440-39-3	Barium	2.8E+01	4.8E+01	MG/KG	CAS09-SB02-1109	5/5	0.35 - 0.56	4.8E+01	8.5E+01	NO	1.5E+03 N	N/A	3.00E+02	N/A	BBK
	7440-41-7	Beryllium	3.9E-01 J	5.9E-01	MG/KG	CAS09-SB01-1009, CAS09-SB02-1109	5/5	0.35 - 0.56	5.9E-01	5.2E-01	YES	1.6E+01 N	NO	5.80E+01	NO	BSL
	7440-70-2	Calcium	6.7E+02	2.0E+03	MG/KG	CAS09-SB02-1109	5/5	4.9 - 7.9	2.0E+03	2.4E+03	NO	N/A	N/A	N/A	N/A	BBK
	7440-47-3	**Chromium**	**1.1E+01 K**	**4.1E+01 K**	**MG/KG**	**CAS09-SB01-1009**	**5/5**	**1 - 3.4**	**4.1E+01**	**3.4E+01**	**YES**	**2.9E-01 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7440-48-4	Cobalt	1.9E+00	4.7E+00	MG/KG	CAS09-SB01-1009	5/5	0.07 - 0.11	4.7E+00	5.2E+00	NO	2.3E+00 N	N/A	4.90E-01	N/A	BBK
	7440-50-8	Copper	3.8E+00 K	1.1E+02 K	MG/KG	CAS09-SB02-1109	5/5	1.7 - 2.8	1.1E+02	3.2E+00	YES	3.1E+02 N	NO	5.10E+01	YES	ASL-SSL
	57-12-5	Cyanide	3.6E-01 J	3.6E-01 J	MG/KG	CAS09-SB01-1009	1/5	0.77 - 0.84	3.6E-01	2.7E+00	NO	1.6E+02 N	N/A	7.40E+00	N/A	BBK
	7439-89-6	Iron	8.4E+03	2.9E+04	MG/KG	CAS09-SB01-1009	5/5	7 - 11	2.9E+04	3.2E+04	NO	5.5E+03 N	N/A	6.40E+02	N/A	BBK
	7439-92-1	Lead	6.9E+00 K	1.0E+01 K	MG/KG	CAS09-SB02-1109	5/5	0.35 - 1.1	1.0E+01	8.8E+00	YES	4.0E+02 NL	NO	N/A	N/A	BSL
	7439-95-4	Magnesium	4.7E+02 K	1.7E+03 K	MG/KG	CAS09-SB01-1009	5/5	3.5 - 11	1.7E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	Manganese	3.4E+01 K	1.1E+02 K	MG/KG	CAS09-SB02-1109	5/5	0.35 - 1.1	1.1E+02	1.8E+02	NO	1.8E+02 N	N/A	5.70E+01	N/A	BBK
	7439-97-6	Mercury	1.0E-02 J	5.0E-02	MG/KG	CAS09-SB05P-1109	3/5	0.032 - 0.039	5.0E-02	1.4E-01	NO	2.3E+00 N	N/A	3.00E-02	N/A	BBK
	7440-02-0	Nickel	3.3E+00 J	1.3E+01 J	MG/KG	CAS09-SB02-1109	5/5	2.8 - 9	1.3E+01	1.8E+01	NO	1.5E+02 N	N/A	4.80E+01	N/A	BBK
	7440-09-7	Potassium	3.0E+02 K	8.8E+02 K	MG/KG	CAS09-SB01-1009	5/5	70 - 110	8.8E+02	9.0E+02	NO	N/A	N/A	N/A	N/A	BBK

Table 2.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 9

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	7782-49-2	Selenium	1.9E-01 J	3.7E-01 J	MG/KG	CAS09-SB02-1109, CAS09-SB05P-1109	5/5	0.35 - 0.56	3.7E-01	6.4E-01	NO	3.9E+01 N	N/A	9.50E-01	N/A	BBK
	7440-23-5	Sodium	2.1E+01 K	5.1E+01 K	MG/KG	CAS09-SB02-1109	5/5	70 - 110	5.1E+01	8.1E+02	NO	N/A	N/A	N/A	N/A	BBK
	7440-62-2	**Vanadium**	**1.4E+01**	**5.2E+01**	**MG/KG**	**CAS09-SB01-1009**	**5/5**	**0.35 - 0.56**	**5.2E+01**	**4.8E+01**	**YES**	**3.9E+01 N**	**YES**	**1.80E+02**	**NO**	**ASL-RSL**
	7440-66-6	Zinc	9.1E+00 K	3.4E+01 K	MG/KG	CAS09-SB02-1109	5/5	1.7 - 2.8	3.4E+01	2.8E+01	YES	2.4E+03 N	NO	6.80E+02	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximum concentrations were compared to background concentrations. If exceedances, the maximum concentrations were then compared to RSLs and SSLs.

[4] Background values from CAX/Yorktown subsurface soil background soil; values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan II and endosulfan sulfate.

[6] Risk-based Soil Screening Levels. ORNL. May 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml

[7] Rationale Codes
Selection Reason: Above Regional Screening Levels (ASL-RSL)
Above Soil Screening Levels (ASL-SSL), not evaluated quantitatively
No Toxicity Information (NTX), not evaluated quantitatively
Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels

TABLE 2.2a

Step 2 Soil Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex, Williamsburg, Virginia

Site 9 - Subsurface Soil

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Metals (mg/kg)								
Aluminum	5 / 5	2.7E+04	CAS09-SB01-1009	7.7E+04	1	0.4	NA	Developmental, Neurological
Arsenic	5 / 5	7.1E+00	CAS09-SB01-1009	3.9E-01	1E-06	NA	2E-05	NA
Chromium	5 / 5	4.1E+01 K	CAS09-SB01-1009	2.9E-01	1E-06	NA	1E-04	NA
Vanadium	5 / 5	5.2E+01	CAS09-SB01-1009	3.9E+02	1	0.1	NA	Hair Cystine
Cumulative Corresponding Hazard Index[c]						**0.5**		
Cumulative Corresponding Cancer Risk[d]							**2E-04**	

Total Developmental HI =	0.4
Total Neurological HI =	0.4
Total Hair Cystine HI =	0.1

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

K = Biased High

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Level

Table 2.2b
Step 3 Soil Screening - Risk Ratio, 95% UCL
Cheatham Annex, Williamsburg, Virginia
Site 9 - Subsurface Soil

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Metals (mg/kg)									
Arsenic	5 / 5	5.9E+00	95% Stud-t	1, 2, 3	3.9E-01	1E-06	NA	2E-05	NA
Chromium	5 / 5	3.5E+01	95% Stud-t	1, 2, 3	2.9E-01	1E-06	NA	1E-04	NA
Cumulative Corresponding Hazard Index[c]							**0.0**		
Cumulative Corresponding Cancer Risk[d]								**1E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.
[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.
[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen
[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,
Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram
HI = Hazard Index
UCL = Upper Confidence Limit
RSL = Regional Screening Level
NA = Not available/not applicable

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations
in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).
Options: 95% Student's-T test UCL (95% Stud-t).

UCL Rationale:
(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.
(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) Maximum detected concentration because sample set less than 5 samples.
(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

Table 2.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] MCL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Groundwater	**56-55-3**	**Benzo(a)anthracene**	**1.6E-01 J**	**1.6E-01 J**	**UG/L**	**CAS09-GW03P-1109**	**1/4**	**0.19 - 0.21**	**1.6E-01**	**N/A**	**N/A**	**3.0E-02 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
Site 4	**50-32-8**	**Benzo(a)pyrene**	**1.1E-01 J**	**1.1E-01 J**	**UG/L**	**CAS09-GW03-1109**	**1/4**	**0.19 - 0.21**	**1.1E-01**	**N/A**	**N/A**	**3.0E-03 C**	**YES**	**2.0E-01**	**NO**	**ASL-RSL**
	72-54-8	4,4'-DDD	1.2E-01 J	1.2E-01 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	1.2E-01	ND	YES	2.8E-01 C	NO	N/A	N/A	BSL
	72-55-9	4,4'-DDE	3.8E-02 J	3.8E-02 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	3.8E-02	ND	YES	2.0E-01 C	NO	N/A	N/A	BSL
	5103-71-9	alpha-Chlordane	3.6E-02 J	3.6E-02 J	UG/L	CAS09-GW04-1109	1/4	0.047 - 0.057	3.6E-02	NE	YES	1.9E-01 C*	NO	N/A	N/A	BSL
	959-98-8	Endosulfan I	3.6E-02 J	3.6E-02 J	UG/L	CAS09-GW04-1109	1/4	0.047 - 0.057	3.6E-02	ND	YES	2.2E+01 N	NO	N/A	N/A	BSL
	33213-65-9	Endosulfan II	2.5E-02 J	2.5E-02 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	2.5E-02	ND	YES	2.2E+01 N	NO	N/A	N/A	BSL
	53494-70-5	Endrin ketone	7.1E-02 J	7.1E-02 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	7.1E-02	ND	YES	1.1E+00 N	NO	N/A	N/A	BSL
	5103-74-2	gamma-Chlordane	4.8E-02	4.8E-02	UG/L	CAS09-GW04-1109	1/4	0.047 - 0.057	4.8E-02	ND	YES	1.9E-01 C*	NO	N/A	N/A	BSL
	7429-90-5	Aluminum	1.3E+02 J	2.8E+03	UG/L	CAS09-GW01-1109	4/4	300 - 300	2.8E+03	2.2E+03	YES	3.7E+03 N	NO	N/A	N/A	BSL
	7440-36-0	Antimony	2.9E-01 J	1.1E+00	UG/L	CAS09-GW03-1109	4/4	1 - 1	1.1E+00	1.9E+01	NO	1.5E+00 N	N/A	6.0E+00	N/A	BBK
	7440-38-2	Arsenic	1.9E+00 J	2.0E+00 J	UG/L	CAS09-GW02-1109	2/4	5 - 5	2.0E+00	2.3E+00	NO	4.5E-02 C	N/A	1.0E+01	N/A	BBK
	7440-39-3	Barium	3.3E+01	5.8E+01	UG/L	CAS09-GW01-1109	4/4	5 - 5	5.8E+01	1.2E+02	NO	7.3E+02 N	N/A	2.0E+03	N/A	BBK
	7440-41-7	Beryllium	1.6E-01 J	1.6E-01 J	UG/L	CAS09-GW01-1109	1/4	1 - 1	1.6E-01	2.5E+00	NO	7.3E+00 N	N/A	4.0E+00	N/A	BBK
	7440-43-9	Cadmium	8.0E-02 J	2.3E-01 J	UG/L	CAS09-GW02-1109	4/4	1 - 1	2.3E-01	6.1E-01	NO	1.8E+00 N	N/A	5.0E+00	N/A	BBK
	7440-70-2	Calcium	1.4E+05	1.5E+05	UG/L	CAS09-GW01-1109	4/4	50 - 50	1.5E+05	1.7E+05	NO	N/A	N/A	N/A	N/A	BBK
	7440-47-3	Chromium	9.5E-01 J	5.1E+00 J	UG/L	CAS09-GW01-1109	3/4	15 - 15	5.1E+00	1.5E+01	NO	4.3E-02 C	N/A	1.0E+02	N/A	BBK
	7440-48-4	Cobalt	3.5E-01 J	7.3E-01 J	UG/L	CAS09-GW01-1109	2/4	30 - 30	7.3E-01	2.1E+01	NO	1.1E+00 N	N/A	N/A	N/A	BBK
	7440-50-8	Copper	1.6E+00 J	2.5E+01	UG/L	CAS09-GW01-1109	4/4	25 - 25	2.5E+01	1.2E+01	YES	1.5E+02 N	NO	1.3E+03	NO	BSL
	7439-89-6	**Iron**	**6.9E+02**	**5.1E+03**	**UG/L**	**CAS09-GW01-1109**	**4/4**	**100 - 100**	**5.1E+03**	**8.9E+02**	**YES**	**2.6E+03 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7439-92-1	Lead	1.2E+00 J	4.3E+00 J	UG/L	CAS09-GW01-1109	4/4	5 - 5	4.3E+00	2.1E+01	NO	N/A	N/A	1.5E+01	N/A	BBK
	7439-95-4	Magnesium	1.8E+03	2.7E+03	UG/L	CAS09-GW02-1109	4/4	50 - 50	2.7E+03	1.2E+04	NO	N/A	N/A	N/A	N/A	BBK
	7439-96-5	**Manganese**	**5.2E+01**	**1.1E+02**	**UG/L**	**CAS09-GW01-1109**	**4/4**	**5 - 5**	**1.1E+02**	**5.8E+01**	**YES**	**8.8E+01 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7440-02-0	Nickel	3.2E-01 J	3.4E+00 J	UG/L	CAS09-GW02-1109	4/4	40 - 40	3.4E+00	1.1E+01	NO	7.3E+01 N	N/A	N/A	N/A	BBK
	7440-09-7	Potassium	1.0E+03	2.2E+03	UG/L	CAS09-GW02-1109	4/4	1000 - 1000	2.2E+03	1.3E+04	NO	N/A	N/A	N/A	N/A	BBK
	7782-49-2	Selenium	3.2E+00 J	3.3E+00 J	UG/L	CAS09-GW02-1109	2/4	10 - 10	3.3E+00	ND	YES	1.8E+01 N	NO	5.0E+01	NO	BSL
	7440-23-5	Sodium	5.3E+03	8.7E+03	UG/L	CAS09-GW04-1109	4/4	1000 - 1000	8.7E+03	6.5E+04	NO	N/A	N/A	N/A	N/A	BBK
	7440-62-2	Vanadium	5.7E+00 J	5.7E+00 J	UG/L	CAS09-GW01-1109	1/4	25 - 25	5.7E+00	2.6E+01	NO	1.8E+01 N	N/A	N/A	N/A	BBK
	7440-66-6	Zinc	2.0E+00 J	1.6E+01 J	UG/L	CAS09-GW01-1109	4/4	25 - 25	1.6E+01	4.5E+00	YES	1.1E+03 N	NO	N/A	N/A	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and MCLs.

[4] Background values from CAX/Yorktown groundwater Yorkown-Eastover Aquiver background sample group (YE); values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Tap Water RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). [Online]. Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for endosulfan used as surrogate for endosulfan I and endosulfan II.
RSL value for endrin used as surrogate for endrin ketone.

[6] Drinking water Maximum Contaminant Level (MCL) (USEPA, 2009).

[7] Rationale Codes

Selection Reason: Above Tap Water Screening Levels (ASL-RSL)
Above Maximim Contaminant Levels (ASL-MCL)
No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
J = Estimated Value
C = Carcinogenic
C* = where: N SL < 100X C SL
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
RSL = Regional Screening Levels

Table 2.3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 9

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Sediment (0 - 4")
Exposure Medium: Surface Sediment (0 - 4")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	7439-95-4	Magnesium	1.5E+03	1.8E+03	MG/KG	CAS09-SD03-1209A	3/3	4.5 - 7.6	1.8E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	Manganese	3.6E+01	1.4E+02	MG/KG	CAS09-SD01-1209A	3/3	0.45 - 0.76	1.4E+02	3.2E+02	NO	1.8E+02 N	N/A	5.70E+01	N/A	BBK
	7439-97-6	Mercury	7.0E-02	2.6E-01	MG/KG	CAS09-SD01-1209A	3/3	0.029 - 0.041	2.6E-01	1.1E-01	YES	2.3E+00 N	NO	3.00E-02	YES	ASL-SSL
	7440-02-0	Nickel	9.0E+00	1.0E+01	MG/KG	CAS09-SD03-1209A	3/3	3.6 - 6.1	1.0E+01	9.5E+00	YES	1.5E+02 N	NO	4.80E+01	NO	BSL
	7440-09-7	Potassium	6.9E+02 K	1.1E+03 K	MG/KG	CAS09-SD03-1209A	3/3	90 - 150	1.1E+03	7.1E+02	YES	N/A	NUT	N/A	NUT	NUT
	7782-49-2	Selenium	6.5E-01 J	6.5E-01 J	MG/KG	CAS09-SD03-1209A	1/3	0.9 - 1.5	6.5E-01	5.1E-01	YES	3.9E+01 N	NO	9.50E-01	NO	BSL
	7440-62-2	**Vanadium**	**2.5E+01**	**4.8E+01**	**MG/KG**	**CAS09-SD03-1209A**	**3/3**	**2.3 - 3.8**	**4.8E+01**	**2.8E+01**	**YES**	**3.9E+01 N**	**YES**	**1.80E+02**	**NO**	**ASL-RSL**
	7440-66-6	Zinc	4.6E+01	1.0E+02	MG/KG	CAS09-SD01-1209A	3/3	1.9 - 3.1	1.0E+02	2.7E+01	YES	2.3E+03 N	NO	6.80E+02	NO	BSL

Note: Because the drainage ditch at Site 9 is dry most of the year, sediment in the ditch was treated like soil.

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximum concentrations were compared to background concentrations. If exceedances, the maximum concentrations were then compared to RSLs and SSLs.

[4] Background values from CAX/Yorktown surface soil background soil; values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan II and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin ketone.

[6] Risk-based Soil Screening Levels. ORNL. May 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml

[7] Rationale Codes

Selection Reason: Above Regional Screening Levels (ASL-RSL)
Above Soil Screening Levels (ASL-SSL), not evaluated quantitatively
No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

COI bgs = below ground surface
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels
COPC = Chemical of Potential Concern

TABLE 2.3a

Step 2 Sediment Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex, Williamsburg, Virginia

Site 9 - Surface Sediment (0 - 4")

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)anthracene	1 / 3	2.6E-01	CAS09-SD01-1209A	1.5E-01	1E-06	NA	2E-06	NA
Benzo(a)pyrene	3 / 3	2.1E-01	CAS09-SD01-1209A	1.5E-02	1E-06	NA	1E-05	NA
Benzo(b)fluoranthene	2 / 3	3.7E-01	CAS09-SD01-1209A	1.5E-01	1E-06	NA	2E-06	NA
Dibenz(a,h)anthracene	2 / 3	7.8E-02 J	CAS09-SD01-1209A	1.5E-02	1E-06	NA	5E-06	NA
Indeno(1,2,3-cd)pyrene	3 / 3	1.9E-01	CAS09-SD01-1209A	1.5E-01	1E-06	NA	1E-06	NA
Pesticides (mg/kg)								
Dieldrin	2 / 3	1.4E-01 J	CAS09-SD01-1209A	3.0E-02	1E-06	NA	5E-06	NA
Aroclor-1260	3 / 3	9.7E+00	CAS09-SD01-1209A	2.2E-01	1E-06	NA	4E-05	NA
Metals (mg/kg)								
Aluminum	3 / 3	2.6E+04	CAS09-SD03-1209A	7.7E+04	1	0.3	NA	Developmental, Neurological
Arsenic	3 / 3	6.5E+00 L	CAS09-SD03-1209A	3.9E-01	1E-06	NA	2E-05	NA
Chromium	3 / 3	3.8E+01 L	CAS09-SD03-1209A	2.9E-01	1E-06	NA	1E-04	NA
Iron	3 / 3	2.5E+04	CAS09-SD03-1209A	5.5E+04	1	0.5	NA	Gastrointestinal
Vanadium	3 / 3	4.8E+01	CAS09-SD03-1209A	3.9E+02	1	0.1	NA	Hair Cystine
Cumulative Corresponding Hazard Index[c]						**1**		
Cumulative Corresponding Cancer Risk[d]							**2E-04**	

Total Developmental HI =	0.3
Total Neurological HI =	0.3
Total Hair Cystine HI =	0.1
Total Gastrointestinal HI =	0.5

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

K = Biased High

L = Biased Low

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Level

Table 2.4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 9

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Subsurface Sediment (4 - 8")
Exposure Medium: Subsurface Sediment (4 - 8")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Subsurface Sediment (4-8") Site 9	127-18-4	Tetrachloroethene	4.0E-03 J	4.0E-03 J	MG/KG	CAS09-SD02-1209B	1/3	0.006 - 0.006	4.0E-03	N/A	N/A	5.5E-01 C	NO	4.90E-05	YES	ASL-SSL
	208-96-8	Acenaphthylene	1.8E-03 J	1.8E-03 J	MG/KG	CAS09-SD02-1209B	1/3	0.022 - 0.026	1.8E-03	N/A	N/A	3.4E+02 N	NO	N/A	N/A	BSL
	50-32-8	Benzo(a)pyrene	9.1E-03 J	1.1E-02 J	MG/KG	CAS09-SD01-1209B	2/3	0.022 - 0.026	1.1E-02	N/A	N/A	1.5E-02 C	NO	3.50E-03	YES	ASL-SSL
	207-08-9	Benzo(k)fluoranthene	5.7E-03 J	6.5E-03 J	MG/KG	CAS09-SD01-1209B	2/3	0.022 - 0.026	6.5E-03	N/A	N/A	1.5E+00 C	NO	3.50E-01	NO	BSL
	218-01-9	Chrysene	3.8E-03 J	7.1E-03 J	MG/KG	CAS09-SD01-1209B	2/3	0.022 - 0.026	7.1E-03	N/A	N/A	1.5E+01 C	NO	1.10E+00	NO	BSL
	206-44-0	Fluoranthene	4.1E-03 J	2.8E-02	MG/KG	CAS09-SD01-1209B	3/3	0.022 - 0.026	2.8E-02	N/A	N/A	2.3E+02 N	NO	1.60E+02	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	1.1E-02 J	1.1E-02 J	MG/KG	CAS09-SD01-1209B, CAS09-SD02-1209B	2/3	0.022 - 0.026	1.1E-02	N/A	N/A	1.5E-01 C	NO	1.20E-01	NO	BSL
	85-01-8	Phenanthrene	1.1E-02 J	1.2E-02 J	MG/KG	CAS09-SD01-1209B	2/3	0.022 - 0.026	1.2E-02	N/A	N/A	1.7E+03 N	NO	N/A	N/A	BSL
	129-00-0	Pyrene	3.3E-03 J	1.8E-02 J	MG/KG	CAS09-SD01-1209B	3/3	0.022 - 0.026	1.8E-02	N/A	N/A	1.7E+02 N	NO	1.20E+02	NO	BSL
	72-54-8	4,4'-DDD	4.6E-02 J	4.6E-02 J	MG/KG	CAS09-SD01-1209B	1/3	0.0036 - 0.0041	4.6E-02	N/A	N/A	2.0E+00 C	NO	6.60E-02	NO	BSL
	72-55-9	4,4'-DDE	5.1E-03 J	5.3E-03 J	MG/KG	CAS09-SD02-1209B	2/3	0.0036 - 0.0041	5.3E-03	N/A	N/A	1.4E+00 C	NO	4.70E-02	NO	BSL
	50-29-3	4,4'-DDT	4.9E-02 J	1.1E-01 J	MG/KG	CAS09-SD02-1209B	3/3	0.0036 - 0.02	1.1E-01	N/A	N/A	1.7E+00 C*	NO	6.70E-02	YES	ASL-SSL
	5103-71-9	alpha-Chlordane	4.8E-04 J	6.2E-04 J	MG/KG	CAS09-SD02-1209B	2/3	0.0019 - 0.0021	6.2E-04	N/A	N/A	1.6E+00 C*	N/A	N/A	N/A	BBK
	11096-82-5	**Aroclor-1260**	**6.2E-01**	**1.7E+00 J**	**MG/KG**	**CAS09-SD02-1209B**	**3/3**	**0.02 - 0.022**	**1.7E+00**	**N/A**	**N/A**	**2.2E-01 C**	**YES**	**2.40E-02**	**YES**	**ASL-RSL, ASL-SSL**
	60-57-1	Dieldrin	7.7E-03 J	7.7E-03 J	MG/KG	CAS09-SD01-1209B	1/3	0.0036 - 0.0041	7.7E-03	N/A	N/A	3.0E-02 C	NO	1.70E-04	YES	ASL-SSL
	33213-65-9	Endosulfan II	5.7E-03 J	1.7E-02 J	MG/KG	CAS09-SD02-1209B	3/3	0.0036 - 0.0041	1.7E-02	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	1031-07-8	Endosulfan sulfate	3.4E-02 J	3.4E-02 J	MG/KG	CAS09-SD01-1209B	1/3	0.0036 - 0.0041	3.4E-02	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	5103-74-2	gamma-Chlordane	4.6E-03 J	1.1E-02 J	MG/KG	CAS09-SD02-1209B	3/3	0.0019 - 0.0021	1.1E-02	N/A	N/A	1.6E+00 C*	NO	N/A	N/A	BSL
	7429-90-5	**Aluminum**	**8.3E+03**	**3.4E+04**	**MG/KG**	**CAS09-SD02-1209B**	**3/3**	**25 - 35**	**3.4E+04**	**1.2E+04**	**YES**	**7.7E+03 N**	**YES**	**5.50E+04**	**NO**	**ASL-RSL**
	7440-38-2	**Arsenic**	**2.1E+00 L**	**1.0E+01 L**	**MG/KG**	**CAS09-SD03-1209B**	**3/3**	**0.68 - 1.9**	**1.0E+01**	**6.4E+00**	**YES**	**3.9E-01 C***	**YES**	**1.30E-03**	**YES**	**ASL-RSL, ASL-SSL**
	7440-39-3	Barium	3.4E+01	7.7E+01	MG/KG	CAS09-SD03-1209B	3/3	0.42 - 0.59	7.7E+01	5.3E+01	YES	1.5E+03 N	NO	3.00E+02	NO	BSL
	7440-41-7	Beryllium	4.0E-01 J	9.9E-01	MG/KG	CAS09-SD02-1209B	3/3	0.42 - 0.59	9.9E-01	5.9E-01	YES	1.6E+01 N	NO	5.80E+01	NO	BSL
	7440-43-9	Cadmium	4.0E-02 J	2.5E-01	MG/KG	CAS09-SD01-1209B	3/3	0.084 - 0.12	2.5E-01	1.5E+00	NO	7.0E+00 N	N/A	1.40E+00	N/A	BBK
	7440-70-2	Calcium	7.2E+02	2.9E+03	MG/KG	CAS09-SD02-1209B	3/3	5.3 - 15	2.9E+03	2.3E+03	YES	N/A	NUT	N/A	NUT	NUT
	7440-47-3	**Chromium**	**1.2E+01 L**	**4.6E+01 L**	**MG/KG**	**CAS09-SD03-1209B**	**3/3**	**1.3 - 3.5**	**4.6E+01**	**1.8E+01**	**YES**	**2.9E-01 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7440-48-4	Cobalt	1.9E+00 J	5.1E+00 J	MG/KG	CAS09-SD03-1209B	3/3	2.5 - 7.1	5.1E+00	9.9E+00	NO	2.3E+00 N	N/A	4.90E-01	N/A	BBK
	7440-50-8	Copper	4.7E+00 J	7.1E+00 J	MG/KG	CAS09-SD01-1209B	3/3	0.28 - 0.39	7.1E+00	4.3E+00	YES	3.1E+02 N	NO	5.10E+01	NO	BSL
	7439-89-6	**Iron**	**8.3E+03**	**3.2E+04**	**MG/KG**	**CAS09-SD03-1209B**	**3/3**	**8.4 - 12**	**3.2E+04**	**2.0E+04**	**YES**	**5.5E+03 N**	**YES**	**6.40E+02**	**YES**	**ASL-RSL, ASL-SSL**
	7439-92-1	Lead	1.2E+01	1.5E+01	MG/KG	CAS09-SD01-1209B	3/3	0.42 - 1.2	1.5E+01	1.7E+01	NO	4.0E+02 NL	N/A	N/A	N/A	BBK
	7439-95-4	Magnesium	6.2E+02	2.3E+03	MG/KG	CAS09-SD02-1209B	3/3	4.2 - 12	2.3E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	Manganese	3.1E+01	8.8E+01	MG/KG	CAS09-SD01-1209B	3/3	0.42 - 1.2	8.8E+01	3.2E+02	NO	1.8E+02 N	N/A	5.70E+01	N/A	BBK
	7439-97-6	Mercury	4.0E-02	1.5E-01	MG/KG	CAS09-SD01-1209B	3/3	0.036 - 0.038	1.5E-01	1.1E-01	YES	2.3E+00 N	NO	3.00E-02	YES	ASL-SSL
	7440-02-0	Nickel	4.2E+00	1.3E+01	MG/KG	CAS09-SD02-1209B, CAS09-SD03-1209B	3/3	3.4 - 9.4	1.3E+01	9.5E+00	YES	1.5E+02 N	NO	4.80E+01	NO	BSL
	7440-09-7	Potassium	4.8E+02 K	1.3E+03 K	MG/KG	CAS09-SD02-1209B	3/3	84 - 240	1.3E+03	7.1E+02	YES	N/A	NUT	N/A	NUT	NUT
	7782-49-2	Selenium	2.1E-01 J	5.3E-01 J	MG/KG	CAS09-SD02-1209B	2/3	0.84 - 2.4	5.3E-01	5.1E-01	YES	3.9E+01 N	NO	9.50E-01	NO	BSL
	7440-28-0	Thallium	3.5E-01 J	3.5E-01 J	MG/KG	CAS09-SD02-1209B	1/3	1.3 - 3.5	3.5E-01	ND	YES	N/A	N/A	N/A	N/A	NTX
	7440-62-2	**Vanadium**	**1.5E+01**	**6.1E+01**	**MG/KG**	**CAS09-SD02-1209B**	**3/3**	**2.1 - 5.9**	**6.1E+01**	**2.8E+01**	**YES**	**3.9E+01 N**	**YES**	**1.80E+02**	**NO**	**ASL-RSL**
	7440-66-6	Zinc	2.5E+01	3.2E+01	MG/KG	CAS09-SD01-1209B	3/3	2.1 - 2.9	3.2E+01	2.7E+01	YES	2.3E+03 N	NO	6.80E+02	NO	BSL

Note: Because the drainage ditch at Site 9 is dry most of the year, sediment in the ditch was treated like soil.

Table 2.4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 9

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Subsurface Sediment (4 - 8")
Exposure Medium: Subsurface Sediment (4 - 8")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and SSLs.

[4] Background values from CAX/Yorktown surface soil background soil; values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan II and endosulfan sulfate.

[6] Risk-based Soil Screening Levels. ORNL. May 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml

[7] Rationale Codes

Selection Reason:
- Above Regional Screening Levels (ASL-RSL)
- Above Soil Screening Levels (ASL-SSL), not evaluated quantitatively
- No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason:
- Below Background (BBK)
- Below Screening Level (BSL)
- Essential Nutrient (NUT)

bgs = below ground surface
COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels

TABLE 2.4a

Step 2 Sediment Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex, Williamsburg, Virginia

Site 9 - Subsurface Sediment (4 - 8")

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Pesticides/PCBs (mg/kg)								
Aroclor-1260	3 / 3	1.7E+00 J	CAS09-SD02-1209B	2.2E-01	1E-06	NA	8E-06	NA
Metals (mg/kg)								
Aluminum	3 / 3	3.4E+04	CAS09-SD02-1209B	7.7E+04	1	0.4	NA	Developmental, Neurological
Arsenic	3 / 3	1.0E+01 L	CAS09-SD03-1209B	3.9E-01	1E-06	NA	3E-05	NA
Chromium	3 / 3	4.6E+01 L	CAS09-SD03-1209B	2.9E-01	1E-06	NA	2E-04	NA
Iron	3 / 3	3.2E+04	CAS09-SD03-1209B	5.5E+04	1	0.6	NA	Gastrointestinal
Vanadium	3 / 3	6.1E+01	CAS09-SD02-1209B	3.9E+02	1	0.2	NA	Hair Cystine
Cumulative Corresponding Hazard Index[c]						**1**		
Cumulative Corresponding Cancer Risk[d]							**2E-04**	

Total Developmental HI =	0.4
Total Neurological HI =	0.4
Total Hair Cystine HI =	0.2
Total Gastrointestinal HI =	**0.6**

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

L = Biased Low

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Level

Table 2.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - Site 9

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] MCL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Groundwater	**56-55-3**	**Benzo(a)anthracene**	**1.6E-01 J**	**1.6E-01 J**	**UG/L**	**CAS09-GW03P-1109**	**1/4**	**0.19 - 0.21**	**1.6E-01**	**N/A**	**N/A**	**3.0E-02 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
Site 9	**50-32-8**	**Benzo(a)pyrene**	**1.1E-01 J**	**1.1E-01 J**	**UG/L**	**CAS09-GW03-1109**	**1/4**	**0.19 - 0.21**	**1.1E-01**	**N/A**	**N/A**	**3.0E-03 C**	**YES**	**2.0E-01**	**NO**	**ASL-RSL**
	72-54-8	4,4'-DDD	1.2E-01 J	1.2E-01 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	1.2E-01	ND	YES	2.8E-01 C	NO	N/A	N/A	BSL
	72-55-9	4,4'-DDE	3.8E-02 J	3.8E-02 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	3.8E-02	ND	YES	2.0E-01 C	NO	N/A	N/A	BSL
	5103-71-9	alpha-Chlordane	3.6E-02 J	3.6E-02 J	UG/L	CAS09-GW04-1109	1/4	0.047 - 0.057	3.6E-02	NE	YES	1.9E-01 C*	NO	N/A	N/A	BSL
	959-98-8	Endosulfan I	3.6E-02 J	3.6E-02 J	UG/L	CAS09-GW04-1109	1/4	0.047 - 0.057	3.6E-02	ND	YES	2.2E+01 N	NO	N/A	N/A	BSL
	33213-65-9	Endosulfan II	2.5E-02 J	2.5E-02 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	2.5E-02	ND	YES	2.2E+01 N	NO	N/A	N/A	BSL
	53494-70-5	Endrin ketone	7.1E-02 J	7.1E-02 J	UG/L	CAS09-GW04-1109	1/4	0.094 - 0.11	7.1E-02	ND	YES	1.1E+00 N	NO	N/A	N/A	BSL
	5103-74-2	gamma-Chlordane	4.8E-02	4.8E-02	UG/L	CAS09-GW04-1109	1/4	0.047 - 0.057	4.8E-02	ND	YES	1.9E-01 C*	NO	N/A	N/A	BSL
	7429-90-5	Aluminum	1.3E+02 J	2.8E+03	UG/L	CAS09-GW01-1109	4/4	300 - 300	2.8E+03	2.2E+03	YES	3.7E+03 N	NO	N/A	N/A	BSL
	7440-36-0	Antimony	2.9E-01 J	1.1E+00	UG/L	CAS09-GW03-1109	4/4	1 - 1	1.1E+00	1.9E+01	NO	1.5E+00 N	N/A	6.0E+00	N/A	BBK
	7440-38-2	Arsenic	1.9E+00 J	2.0E+00 J	UG/L	CAS09-GW02-1109	2/4	5 - 5	2.0E+00	2.3E+00	NO	4.5E-02 C	N/A	1.0E+01	N/A	BBK
	7440-39-3	Barium	3.3E+01	5.8E+01	UG/L	CAS09-GW01-1109	4/4	5 - 5	5.8E+01	1.2E+02	NO	7.3E+02 N	N/A	2.0E+03	N/A	BBK
	7440-41-7	Beryllium	1.6E-01 J	1.6E-01 J	UG/L	CAS09-GW01-1109	1/4	1 - 1	1.6E-01	2.5E+00	NO	7.3E+00 N	N/A	4.0E+00	N/A	BBK
	7440-43-9	Cadmium	8.0E-02 J	2.3E-01 J	UG/L	CAS09-GW02-1109	4/4	1 - 1	2.3E-01	6.1E-01	NO	1.8E+00 N	N/A	5.0E+00	N/A	BBK
	7440-70-2	Calcium	1.4E+05	1.5E+05	UG/L	CAS09-GW01-1109	4/4	50 - 50	1.5E+05	1.7E+05	NO	N/A	N/A	N/A	N/A	BBK
	7440-47-3	Chromium	9.5E-01 J	5.1E+00 J	UG/L	CAS09-GW01-1109	3/4	15 - 15	5.1E+00	1.5E+01	NO	4.3E-02 C	N/A	1.0E+02	N/A	BBK
	7440-48-4	Cobalt	3.5E-01 J	7.3E-01 J	UG/L	CAS09-GW01-1109	2/4	30 - 30	7.3E-01	2.1E+01	NO	1.1E+00 N	N/A	N/A	N/A	BBK
	7440-50-8	Copper	1.6E+00 J	2.5E+01	UG/L	CAS09-GW01-1109	4/4	25 - 25	2.5E+01	1.2E+01	YES	1.5E+02 N	NO	1.3E+03	NO	BSL
	7439-89-6	**Iron**	**6.9E+02**	**5.1E+03**	**UG/L**	**CAS09-GW01-1109**	**4/4**	**100 - 100**	**5.1E+03**	**8.9E+02**	**YES**	**2.6E+03 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7439-92-1	Lead	1.2E+00 J	4.3E+00 J	UG/L	CAS09-GW01-1109	4/4	5 - 5	4.3E+00	2.1E+01	NO	N/A	N/A	1.5E+01	N/A	BBK
	7439-95-4	Magnesium	1.8E+03	2.7E+03	UG/L	CAS09-GW02-1109	4/4	50 - 50	2.7E+03	1.2E+04	NO	N/A	N/A	N/A	N/A	BBK
	7439-96-5	**Manganese**	**5.2E+01**	**1.1E+02**	**UG/L**	**CAS09-GW01-1109**	**4/4**	**5 - 5**	**1.1E+02**	**5.8E+01**	**YES**	**8.8E+01 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7440-02-0	Nickel	3.2E-01 J	3.4E+00 J	UG/L	CAS09-GW02-1109	4/4	40 - 40	3.4E+00	1.1E+01	NO	7.3E+01 N	N/A	N/A	N/A	BBK
	7440-09-7	Potassium	1.0E+03	2.2E+03	UG/L	CAS09-GW02-1109	4/4	1000 - 1000	2.2E+03	1.3E+04	NO	N/A	N/A	N/A	N/A	BBK
	7782-49-2	Selenium	3.2E+00 J	3.3E+00 J	UG/L	CAS09-GW02-1109	2/4	10 - 10	3.3E+00	ND	YES	1.8E+01 N	NO	5.0E+01	NO	BSL
	7440-23-5	Sodium	5.3E+03	8.7E+03	UG/L	CAS09-GW04-1109	4/4	1000 - 1000	8.7E+03	6.5E+04	NO	N/A	N/A	N/A	N/A	BBK
	7440-62-2	Vanadium	5.7E+00 J	5.7E+00 J	UG/L	CAS09-GW01-1109	1/4	25 - 25	5.7E+00	2.6E+01	NO	1.8E+01 N	N/A	N/A	N/A	BBK
	7440-66-6	Zinc	2.0E+00 J	1.6E+01 J	UG/L	CAS09-GW01-1109	4/4	25 - 25	1.6E+01	4.5E+00	YES	1.1E+03 N	NO	N/A	N/A	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and MCLs.

[4] Background values from CAX/Yorktown groundwater Yorkown-Eastover Aquiver background sample group (YE); values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Tap Water RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). [Online]. Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for endosulfan used as surrogate for endosulfan I and endosulfan II.
RSL value for endrin used as surrogate for endrin ketone.

[6] Drinking water Maximum Contaminant Level (MCL) (USEPA, 2009).

[7] Rationale Codes

Selection Reason: Above Tap Water Screening Levels (ASL-RSL)
Above Maximim Contaminant Levels (ASL-MCL)
No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
J = Estimated Value
C = Carcinogenic
C* = where: N SL < 100X C SL
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
RSL = Regional Screening Levels

TABLE 2.5a

Step 2 Groundwater Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site 9 - Groundwater

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (ug/L)								
Benzo(a)anthracene	1 / 4	1.6E-01 J	CAS09-GW03P-1109	3.0E-02	1E-06	NA	5E-06	NA
Benzo(a)pyrene	1 / 4	1.1E-01 J	CAS09-GW03-1109	3.0E-03	1E-06	NA	4E-05	NA
Metals (ug/L)								
Iron	4 / 4	5.1E+03	CAS09-GW01-1109	2.6E+04	1	0.2	NA	Gastrointestinal
Manganese	4 / 4	1.1E+02	CAS09-GW01-1109	8.8E+02	1	0.1	NA	CNS
Cumulative Corresponding Hazard Index[c]						**0.3**		
Cumulative Corresponding Cancer Risk[d]							**4E-05**	
							Total CNS HI =	0.1
							Total Gastrointestinal HI =	0.2

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,
otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

µg/L = micrograms per liter

NA = Not available/not applicable

RSL = Regional Screening Level

Attachment A.3
AOC 3

Table 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3
Cheatham Annex, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Surface Soil AOC 3	78-93-3	2-Butanone	2.2E-02 J	2.4E-02 J	MG/KG	CAA03-SS09-1109	2/11	0.01207 - 0.034	2.4E-02	N/A	N/A	2.8E+03 N	NO	1.5E+00	NO	BSL
	67-64-1	Acetone	1.0E-01 J	6.4E-01 J	MG/KG	CAA03-SS09-1109	3/11	0.01207 - 0.034	6.4E-01	N/A	N/A	6.1E+03 N	NO	4.5E+00	NO	BSL
	67-66-3	Chloroform	6.0E-04 J	9.0E-04 J	MG/KG	CAA03-SS09-1109	3/11	0.006 - 0.01207	9.0E-04	N/A	N/A	2.9E-01 C	NO	5.3E-05	YES	ASL-SSL
	75-09-2	Methylene chloride	9.0E-03 J	1.3E-02 J	MG/KG	CAA03-SS06-1109	3/11	0.01207 - 0.034	1.3E-02	N/A	N/A	1.1E+01 C	NO	1.2E-03	YES	ASL-SSL
	100-42-5	Styrene	1.0E-03 J	1.0E-02 J	MG/KG	CAA03-SS10-1109	2/11	0.005 - 0.01207	1.0E-02	N/A	N/A	6.3E+02 NS	NO	1.8E+00	NO	BSL
	108-88-3	Toluene	3.0E-03 J	3.0E-03 J	MG/KG	CAA03-SS10-1109	1/11	0.005 - 0.01207	3.0E-03	N/A	N/A	5.0E+02 NS	NO	1.6E+00	NO	BSL
	92-52-4	1,1-Biphenyl	3.8E+00	3.8E+00	MG/KG	CAA03-SS06-1109	1/10	0.34 - 0.42	3.8E+00	N/A	N/A	2.1E+02 NS	NO	1.9E+01	NO	BSL
	105-67-9	2,4-Dimethylphenol	4.2E-01 J	4.2E-01 J	MG/KG	CAA03-SS06-1109	1/11	0.52 - 3.9	4.2E-01	N/A	N/A	1.2E+02 N	NO	8.6E-01	NO	BSL
	91-57-6	2-Methylnaphthalene	6.8E-03 J	2.5E-02	MG/KG	CAA03-SS02-1109	4/11	0.021 - 49	2.5E-02	N/A	N/A	3.1E+01 N	NO	7.5E-01	NO	BSL
	95-48-7	2-Methylphenol	4.4E-01 J	4.4E-01 J	MG/KG	CAA03-SS06-1109	1/11	0.62 - 3.9	4.4E-01	N/A	N/A	3.1E+02 N	NO	1.5E+00	NO	BSL
	m&pCRESOL	3- and 4-Methylphenol	1.2E+00	1.2E+00	MG/KG	CAA03-SS06-1109	1/10	0.59 - 0.73	1.2E+00	N/A	N/A	3.1E+01 N	NO	N/A	N/A	BSL
	83-32-9	Acenaphthene	6.9E-03 J	2.4E+01 J	MG/KG	CAA03-SS06-1109	6/11	0.021 - 49	2.4E+01	N/A	N/A	3.4E+02 N	NO	2.2E+01	YES	ASL-SSL
	208-96-8	Acenaphthylene	3.8E-03 J	4.1E+00 J	MG/KG	CAA03-SS06-1109	7/11	0.021 - 49	4.1E+00	N/A	N/A	3.4E+02 N	NO	N/A	N/A	BSL
	120-12-7	Anthracene	2.7E-03 J	1.4E+02	MG/KG	CAA03-SS06-1109	9/11	0.021 - 49	1.4E+02	N/A	N/A	1.7E+03 N	NO	3.6E+02	NO	BSL
	100-52-7	Benzaldehyde	2.0E-01 J	2.0E-01 J	MG/KG	CAA03-SS08P-1109	1/10	0.37 - 0.46	2.0E-01	N/A	N/A	7.8E+02 NS	NO	8.1E-01	NO	BSL
	56-55-3	**Benzo(a)anthracene**	**1.4E-02 J**	**1.8E+02**	**MG/KG**	**CAA03-SS06-1109**	**11/11**	**0.021 - 49**	**1.8E+02**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**1.0E-02**	**YES**	**ASL-RSL, ASL-SSL**
	50-32-8	**Benzo(a)pyrene**	**1.1E-02 J**	**1.3E+02**	**MG/KG**	**CAA03-SS06-1109**	**11/11**	**0.021 - 49**	**1.3E+02**	**N/A**	**N/A**	**1.5E-02 C**	**YES**	**3.5E-03**	**YES**	**ASL-RSL, ASL-SSL**
	205-99-2	**Benzo(b)fluoranthene**	**2.0E-02 J**	**2.0E+02**	**MG/KG**	**CAA03-SS06-1109**	**11/11**	**0.021 - 49**	**2.0E+02**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**3.5E-02**	**YES**	**ASL-RSL, ASL-SSL**
	191-24-2	Benzo(g,h,i)perylene	2.3E-02 L	6.6E+01 L	MG/KG	CAA03-SS06-1109	7/10	0.021 - 49	6.6E+01	N/A	N/A	1.7E+02 N	NO	N/A	N/A	BSL
	207-08-9	**Benzo(k)fluoranthene**	**9.2E-03 J**	**8.1E+01**	**MG/KG**	**CAA03-SS06-1109**	**8/11**	**0.021 - 49**	**8.1E+01**	**N/A**	**N/A**	**1.5E+00 C**	**YES**	**3.5E-01**	**YES**	**ASL-RSL, ASL-SSL**
	117-81-7	bis(2-Ethylhexyl)phthalate	7.8E-01 J	7.8E-01 J	MG/KG	CAA03-SS07-1109	1/11	0.1 - 240	7.8E-01	N/A	N/A	3.5E+01 C*	NO	1.1E+00	NO	BSL
	85-68-7	Butylbenzylphthalate	2.8E+00	2.8E+00	MG/KG	CAA03-SS07-1109	1/11	0.34 - 3.9	2.8E+00	N/A	N/A	2.6E+02 C*	NO	5.1E-01	YES	ASL-SSL
	86-74-8	Carbazole	3.2E-03 J	1.2E+02 J	MG/KG	CAA03-SS06-1109	10/11	0.021 - 49	1.2E+02	N/A	N/A	N/A	N/A	N/A	N/A	NTX
	218-01-9	**Chrysene**	**1.2E-02 J**	**2.1E+02**	**MG/KG**	**CAA03-SS06-1109**	**11/11**	**0.021 - 49**	**2.1E+02**	**N/A**	**N/A**	**1.5E+01 C**	**YES**	**1.1E+00**	**YES**	**ASL-RSL, ASL-SSL**
	53-70-3	**Dibenz(a,h)anthracene**	**3.6E-03 J**	**2.2E+01 K**	**MG/KG**	**CAA03-SS06-1109**	**9/11**	**0.021 - 49**	**2.2E+01**	**N/A**	**N/A**	**1.5E-02 C**	**YES**	**1.1E-02**	**YES**	**ASL-RSL, ASL-SSL**
	132-64-9	**Dibenzofuran**	**1.9E+01**	**1.9E+01**	**MG/KG**	**CAA03-SS06-1109**	**1/11**	**0.34 - 3.9**	**1.9E+01**	**N/A**	**N/A**	**7.8E+00 N**	**YES**	**6.8E-01**	**YES**	**ASL-RSL, ASL-SSL**
	117-84-0	Di-n-octylphthalate	7.7E-01	7.7E-01	MG/KG	CAA03-SS07-1109	1/11	0.67 - 3.9	7.7E-01	N/A	N/A	3.5E+01 C*	NO	N/A	N/A	BSL
	206-44-0	**Fluoranthene**	**3.1E-02**	**5.0E+02**	**MG/KG**	**CAA03-SS06-1109**	**11/11**	**0.021 - 49**	**5.0E+02**	**N/A**	**N/A**	**2.3E+02 N**	**YES**	**1.6E+02**	**YES**	**ASL-RSL, ASL-SSL**
	86-73-7	Fluorene	1.1E-02 J	4.0E+01 J	MG/KG	CAA03-SS06-1109	6/11	0.021 - 49	4.0E+01	N/A	N/A	2.3E+02 N	NO	2.7E+01	YES	ASL-SSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	**2.9E-02**	**6.9E+01 J**	**MG/KG**	**CAA03-SS06-1109**	**9/11**	**0.021 - 49**	**6.9E+01**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**1.2E-01**	**YES**	**ASL-RSL, ASL-SSL**
	91-20-3	**Naphthalene**	**7.7E-03 J**	**2.6E+01 J**	**MG/KG**	**CAA03-SS06-1109**	**5/11**	**0.021 - 49**	**2.6E+01**	**N/A**	**N/A**	**3.6E+00 C***	**YES**	**4.7E-04**	**YES**	**ASL-RSL, ASL-SSL**
	85-01-8	Phenanthrene	1.7E-02 J	4.7E+02	MG/KG	CAA03-SS06-1109	11/11	0.021 - 49	4.7E+02	N/A	N/A	1.7E+03 N	NO	N/A	N/A	BSL
	108-95-2	Phenol	6.0E-01	6.0E-01	MG/KG	CAA03-SS06-1109	1/11	0.49 - 3.9	6.0E-01	N/A	N/A	1.8E+03 N	NO	6.3E+00	NO	BSL
	129-00-0	**Pyrene**	**2.6E-02**	**3.9E+02**	**MG/KG**	**CAA03-SS06-1109**	**11/11**	**0.021 - 49**	**3.9E+02**	**N/A**	**N/A**	**1.7E+02 N**	**YES**	**1.2E+02**	**YES**	**ASL-RSL, ASL-SSL**
	72-54-8	4,4'-DDD	2.3E-03 J	2.8E-01 J	MG/KG	CAA03-SS06-1109	8/11	0.0032 - 0.078	2.8E-01	N/A	N/A	2.0E+00 C	NO	6.6E-02	YES	ASL-SSL
	72-55-9	4,4'-DDE	8.0E-04 J	8.3E-02	MG/KG	CAA03-SS02-1109	7/11	0.0032 - 0.078	8.3E-02	N/A	N/A	1.4E+00 C	NO	4.7E-02	YES	ASL-SSL
	50-29-3	4,4'-DDT	1.6E-03 J	8.8E-02 J	MG/KG	CAA03-SS06-1109	9/11	0.0032 - 0.078	8.8E-02	N/A	N/A	1.7E+00 C*	NO	6.7E-02	YES	ASL-SSL
	5103-71-9	alpha-Chlordane	9.9E-04 J	9.9E-04 J	MG/KG	CAA03-SS02-1109	1/11	0.0016 - 0.04	9.9E-04	N/A	N/A	1.6E+00 C*	NO	N/A	N/A	BSL
	11096-82-5	Aroclor-1260	9.1E-02 K	9.1E-02 K	MG/KG	CAS004-4HA06-00-1199	1/11	0.017 - 0.039	9.1E-02	N/A	N/A	2.2E-01 C	NO	2.40E-02	YES	ASL-SSL
	319-86-8	delta-BHC	1.4E-01 J	1.4E-01 J	MG/KG	CAA03-SS06-1109	1/11	0.0016 - 0.04	1.4E-01	N/A	N/A	2.7E-01 C	NO	N/A	N/A	BSL
	60-57-1	**Dieldrin**	**1.4E-03 J**	**6.5E-01 J**	**MG/KG**	**CAA03-SS06-1109**	**2/11**	**0.0032 - 0.0042**	**6.5E-01**	**N/A**	**N/A**	**3.0E-02 C**	**YES**	**1.7E-04**	**YES**	**ASL-RSL, ASL-SSL**
	959-98-8	Endosulfan I	9.1E-04 J	2.2E+00 J	MG/KG	CAA03-SS06-1109	2/11	0.0016 - 0.0021	2.2E+00	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	1031-07-8	Endosulfan sulfate	1.9E-03 J	8.9E-03 J	MG/KG	CAA03-SS02-1109	2/11	0.0032 - 0.078	8.9E-03	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL

Table 2.1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	72-20-8	Endrin	3.9E-03	1.3E-01 J	MG/KG	CAA03-SS06-1109	6/11	0.0032 - 0.078	1.3E-01	N/A	N/A	1.8E+00 N	NO	4.4E-01	NO	BSL
	7421-93-4	Endrin aldehyde	2.2E-03 J	5.4E-03 J	MG/KG	CAA03-SS08P-1109	4/11	0.0032 - 0.078	5.4E-03	N/A	N/A	1.8E+00 N	NO	N/A	N/A	BSL
	58-89-9	**gamma-BHC (Lindane)**	**8.2E-04 J**	**8.6E-01**	**MG/KG**	**CAA03-SS06-1109**	**4/11**	**0.0016 - 0.04**	**8.6E-01**	**N/A**	**N/A**	**5.2E-01 C***	**YES**	**3.6E-04**	**YES**	**ASL-RSL, ASL-SSL**
	7429-90-5	**Aluminum**	**4.0E+03**	**1.3E+04**	**MG/KG**	**CAA03-SS01-1109, CAA03-SS08P-1109**	**11/11**	**21 - 40.1**	**1.3E+04**	**1.2E+04**	**YES**	**7.7E+03 N**	**YES**	**5.5E+04**	**NO**	**ASL-Res**
	7440-36-0	Antimony	7.0E-02 L	2.5E-01 L	MG/KG	CAA03-SS03-1109	10/11	0.07 - 0.44	2.5E-01	1.1E+01	NO	3.1E+00 N	N/A	6.6E-01	N/A	BBK
	7440-38-2	**Arsenic**	**1.0E+00**	**7.3E+00**	**MG/KG**	**CAA03-SS01-1109**	**11/11**	**0.35 - 2**	**7.3E+00**	**6.4E+00**	**YES**	**3.9E-01 C***	**YES**	**1.3E-03**	**YES**	**ASL-RSL, ASL-SSL**
	7440-39-3	Barium	1.1E+01	1.0E+02 J	MG/KG	CAS004-4HA06-00-1199	11/11	0.35 - 40.1	1.0E+02	5.3E+01	YES	1.5E+03 N	NO	3.0E+02	NO	BSL
	7440-41-7	Beryllium	1.9E-01 J	7.2E-01	MG/KG	CAA03-SS06-1109	10/11	0.35 - 1	7.2E-01	5.9E-01	YES	1.6E+01 N	NO	5.8E+01	NO	BSL
	7440-43-9	Cadmium	4.0E-02 J	7.0E-01 J	MG/KG	CAA03-SS07-1109	6/11	0.34 - 1.4	7.0E-01	1.5E+00	NO	7.0E+00 N	N/A	1.4E+00	N/A	BBK
	7440-70-2	Calcium	3.2E+02	1.9E+04 J	MG/KG	CAA03-SS06-1109	11/11	4.9 - 1002.8	1.9E+04	2.3E+03	YES	N/A	NUT	N/A	NUT	NUT
	7440-47-3	**Chromium**	**5.8E+00**	**5.7E+01**	**MG/KG**	**CAS004-4HA06-00-1199**	**11/11**	**1.2 - 2.1**	**5.7E+01**	**1.8E+01**	**YES**	**2.9E-01 C**	**YES**	**8.3E-04**	**YES**	**ASL-RSL, ASL-SSL**
	7440-48-4	Cobalt	7.2E-01	8.8E+00 J	MG/KG	CAS004-4HA06-00-1199	11/11	0.07 - 10	8.8E+00	9.9E+00	NO	2.3E+00 N	N/A	4.9E-01	N/A	BBK
	7440-50-8	Copper	1.9E+00 J	7.8E+01 J	MG/KG	CAS004-4HA06-00-1199	11/11	1.7 - 5	7.8E+01	4.3E+00	YES	3.1E+02 N	NO	5.1E+01	YES	ASL-SSL
	57-12-5	Cyanide	7.0E-02 L	7.0E-02 L	MG/KG	CAS004-4HA06-00-1199	1/11	0.6 - 0.84	7.0E-02	ND	YES	1.6E+02 N	NO	7.40E+00	NO	BSL
	7439-89-6	**Iron**	**3.5E+03**	**6.2E+04 L**	**MG/KG**	**CAS004-4HA06-00-1199**	**11/11**	**7 - 20.1**	**6.2E+04**	**2.0E+04**	**YES**	**5.5E+03 N**	**YES**	**6.4E+02**	**YES**	**ASL-RSL, ASL-SSL**
	7439-92-1	**Lead**	**9.2E+00**	**7.9E+02**	**MG/KG**	**CAA03-SS06-1109**	**11/11**	**0.42 - 0.7**	**7.9E+02**	**1.7E+01**	**YES**	**4.0E+02 NL**	**YES**	**N/A**	**N/A**	**ASL-Res**
	7439-95-4	Magnesium	3.4E+02	4.1E+03	MG/KG	CAA03-SS07-1109	11/11	4.2 - 1002.8	4.1E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	Manganese	1.9E+01	3.2E+02	MG/KG	CAA03-SS07-1109	11/11	0.42 - 3	3.2E+02	3.2E+02	NO	1.8E+02 N	N/A	5.7E+01	N/A	BBK
	7439-97-6	Mercury	1.0E-02 J	1.2E-01	MG/KG	CAA03-SS02-1109	10/11	0.034 - 0.1	1.2E-01	1.1E-01	YES	2.3E+00 N	NO	3.0E-02	YES	ASL-SSL
	7440-02-0	Nickel	1.8E+00 J	4.0E+01	MG/KG	CAS004-4HA06-00-1199	11/11	3.3 - 8	4.0E+01	9.5E+00	YES	1.5E+02 N	NO	4.8E+01	NO	BSL
	7440-09-7	Potassium	2.6E+02	2.8E+03	MG/KG	CAA03-SS07-1109	11/11	70 - 1002.8	2.8E+03	7.1E+02	YES	N/A	NUT	N/A	NUT	NUT
	7782-49-2	Selenium	1.6E-01 J	8.4E-01	MG/KG	CAA03-SS06-1109	10/11	0.35 - 0.61	8.4E-01	5.1E-01	YES	3.9E+01 N	NO	9.5E-01	NO	BSL
	7440-22-4	Silver	1.0E-01 J	2.1E+01 L	MG/KG	CAS004-4HA06-00-1199	4/11	1.2 - 2.1	2.1E+01	2.1E+00	YES	3.9E+01 N	NO	1.6E+00	YES	ASL-SSL
	7440-23-5	Sodium	1.5E+01 J	1.8E+02 K	MG/KG	CAA03-SS06-1109	10/11	70 - 1002.8	1.8E+02	5.2E+02	NO	N/A	N/A	N/A	N/A	BBK
	7440-28-0	Thallium	1.1E+00 L	1.1E+00 L	MG/KG	CAS004-4HA06-00-1199	1/11	0.14 - 2	1.1E+00	ND	YES	N/A	N/A	N/A	N/A	NTX
	7440-62-2	Vanadium	8.6E+00	3.6E+01 J	MG/KG	CAS004-4HA06-00-1199	11/11	0.35 - 10	3.6E+01	2.8E+01	YES	3.9E+01 N	NO	2.6E+00	YES	ASL-SSL
	7440-66-6	Zinc	9.7E+00	1.5E+02	MG/KG	CAA03-SS07-1109	11/11	1.7 - 4	1.5E+02	2.7E+01	YES	2.3E+03 N	NO	6.8E+02	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and SSLs.

[4] Background values from CAX/Yorktown surface soil background soil; values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Residential Soil RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for p-Cresol used as surrogate for 3- and 4-methylphenol.
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for bis(2-Ethylhexyl)phthalate used as a surrogate for di-n-octylphthalate.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical-HCH used as surrogate for delta-BHC.
RSL value for Chromium(VI) used as surrogate for chromium.

COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL,
therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels

Table 2.1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3
Cheatham Annex, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection

The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for Vanadium and Compounds used as surrogate for vanadium.
RSL value for endosulfan used as surrogate for endosulfan I and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde.

[6] Risk-based Soil Screening Levels. ORNL. December 2009. Regional Screening Levels for Chemical Contaminants at Superfund Sites. Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml

[7] Rationale Codes

Selection Reason: Above Regional Screening Level (ASL-RSL)
Above Soil Screening Level (ASL-SSL), not evaluated quantitatively
No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

TABLE 2.1a

Step 2 Soil Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex, Williamsburg, Virginia

AOC 3 - Surface Soil

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)		Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)									
Benzo(a)anthracene	11 / 11	1.8E+02		CAA03-SS06-1109	1.5E-01	1E-06	NA	1E-03	NA
Benzo(a)pyrene	11 / 11	1.3E+02		CAA03-SS06-1109	1.5E-02	1E-06	NA	9E-03	NA
Benzo(b)fluoranthene	11 / 11	2.0E+02		CAA03-SS06-1109	1.5E-01	1E-06	NA	1E-03	NA
Benzo(k)fluoranthene	8 / 11	8.1E+01		CAA03-SS06-1109	1.5E+00	1E-06	NA	5E-05	NA
Chrysene	11 / 11	2.1E+02		CAA03-SS06-1109	1.5E+01	1E-06	NA	1E-05	NA
Dibenz(a,h)anthracene	9 / 11	2.2E+01	K	CAA03-SS06-1109	1.5E-02	1E-06	NA	1E-03	NA
Dibenzofuran	1 / 11	1.9E+01		CAA03-SS06-1109	7.8E+01	1	0.2	NA	Whole body, Organ Weight
Fluoranthene	11 / 11	5.0E+02		CAA03-SS06-1109	2.3E+03	1	0.2	NA	Liver, Kidney, Blood
Indeno(1,2,3-cd)pyrene	9 / 11	6.9E+01	J	CAA03-SS06-1109	1.5E-01	1E-06	NA	5E-04	NA
Naphthalene	5 / 11	2.6E+01	J	CAA03-SS06-1109	3.6E+00	1E-06	NA	7E-06	NA
Pyrene	11 / 11	3.9E+02		CAA03-SS06-1109	1.7E+03	1	0.2	NA	Kidney
Pesticides (mg/kg)									
Dieldrin	2 / 11	6.5E-01	J	CAA03-SS06-1109	3.0E-02	1E-06	NA	2E-05	NA
gamma-BHC (Lindane)	4 / 11	8.6E-01		CAA03-SS06-1109	5.2E-01	1E-06	NA	2E-06	NA
Metals (mg/kg)									
Aluminum	11 / 11	1.3E+04		CAA03-SS01-1109,CAA03-SS08P-1109	7.7E+04	1	0.2	NA	Developmental, Neurological
Arsenic	11 / 11	7.3E+00		CAA03-SS01-1109	3.9E-01	1E-06	NA	2E-05	NA
Chromium	11 / 11	5.7E+01	K	CAS004-4HA06-00-1199	2.9E-01	1E-06	NA	2E-04	NA
Iron	11 / 11	6.2E+04	L	CAS004-4HA06-00-1199	5.5E+04	1	1	NA	Gastrointestinal
Lead	11 / 11	7.9E+02		CAA03-SS06-1109	NA	NA	NA	NA	NA
Cumulative Corresponding Hazard Index[c]							**2**		
Cumulative Corresponding Cancer Risk[d]								**1E-02**	

Total Liver HI =	0.2
Total Kidney HI =	0.4
Total Blood HI =	0.2
Total Developmental HI =	0.2
Total Neurological/CNS HI =	0.2
Total Gastrointestinal HI =	**1**
Total Whole Body HI =	0.2
Total Organ Weights HI =	0.2

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

K = Biased High

L = Biased Low

mg/kg = milligrams per kilogram

NA = Not available/not applicable

Table 2.1b
Step 3 Soil Screening - Risk Ratio, 95% UCL
Cheatham Annex, Williamsburg, Virginia
AOC 3 - Surface Soil

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)									
Benzo(a)anthracene	11 / 11	1.8E+02	99% Cheb-m	1	1.5E-01	1E-06	NA	1E-03	NA
Benzo(a)pyrene	11 / 11	1.3E+02	99% Cheb-m	1	1.5E-02	1E-06	NA	9E-03	NA
Benzo(b)fluoranthene	11 / 11	2.0E+02	99% Cheb-m	1	1.5E-01	1E-06	NA	1E-03	NA
Benzo(k)fluoranthene	8 / 11	8.1E+01	Max	6	1.5E+00	1E-06	NA	5E-05	NA
Chrysene	11 / 11	1.4E+02	97.5% Cheb-m	1	1.5E+01	1E-06	NA	9E-06	NA
Dibenz(a,h)anthracene	9 / 11	2.2E+01	Max	6	1.5E-02	1E-06	NA	1E-03	NA
Indeno(1,2,3-cd)pyrene	9 / 11	6.9E+01	Max	6	1.5E-01	1E-06	NA	5E-04	NA
Naphthalene	5 / 11	2.6E+01	Max	6	3.6E+00	1E-06	NA	7E-06	NA
Pesticides (mg/kg)									
Dieldrin	2 / 11	6.5E-01	Max	6	3.0E-02	1E-06	NA	2E-05	NA
gamma-BHC (Lindane)	4 / 11	2.4E-01	95% KM-t	1, 3	5.2E-01	1E-06	NA	5E-07	NA
Metals (mg/kg)									
Arsenic	11 / 11	4.2E+00	G-App	1, 3	3.9E-01	1E-06	NA	1E-05	NA
Chromium	11 / 11	2.8E+01	G-App	1, 3	2.9E-01	1E-06	NA	1E-04	NA
Iron	11 / 11	2.5E+04	G-App	1, 3	5.5E+04	1	0.5	NA	Gastrointestinal
Cumulative Corresponding Hazard Index[c]							**0.5**		
Cumulative Corresponding Cancer Risk[d]								**1E-02**	
								Total Gastrointestinal HI =	0.5

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.
[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.
[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.
[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.
Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,
Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram
HI = Hazard Index
UCL = Upper Confidence Limit
RSL = Regional Screening Level
NA = Not available/not applicable

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations
in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).
Options: Maximum Detected Value (M); 99% Kaplan-Meier Chebyshev (99% KM); 95% Kaplan-Meier (t) UCL (95% KM-t); 95% Kaplan-Meier (percentile Bootstrap) (95% KM-b);
95% Kaplan-Meier (BCA) UCL (95% KM-BCA); 95% Kaplan-Meier Chebyshev (95% KM); 95% Chebyshev (mean, std) UCL (95% Cheb-m); 99% Chebyshev (mean, std) UCL (99% Cheb-m); Approximate Gamma UCL (G-App);
95% Student's-T test UCL (95% Stud-t); 99% Chebyshev (Mean, Sd) UCL (99% Cheb-m); 97.5% Kaplan-Meier Chebyshev UCL (97.5% KM)

UCL Rationale:
(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.
(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) Maximum detected concentration because sample set less than 5 samples.
(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Subsurface Soil	78-93-3	2-Butanone	3.1E-02 J	4.0E-02 J	MG/KG	CAA03-SB04-1109B	3/15	0.01275 - 0.05	4.0E-02	N/A	N/A	2.8E+03 N	NO	1.5E+00	NO	BSL
AOC 3	67-64-1	Acetone	2.1E-01 J	3.1E-01 J	MG/KG	CAA03-SB04-1109B	4/15	0.01275 - 0.05	3.1E-01	N/A	N/A	6.1E+03 N	NO	4.5E+00	NO	BSL
	71-43-2	Benzene	2.0E-03 J	2.0E-03 J	MG/KG	CAA03-SB05-1109B	1/15	0.005 - 0.01275	2.0E-03	N/A	N/A	1.1E+00 C*	NO	2.1E-04	YES	ASL-SSL
	75-15-0	Carbon disulfide	1.0E-03 J	4.0E-03 J	MG/KG	CAA03-SB02-1109B	3/15	0.005 - 0.01275	4.0E-03	N/A	N/A	8.2E+01 NS	NO	3.1E-01	NO	BSL
	67-66-3	Chloroform	8.0E-04 J	1.0E-03 J	MG/KG	CAA03-SB05-1109A	2/15	0.006 - 0.01275	1.0E-03	N/A	N/A	2.9E-01 C	NO	5.3E-05	YES	ASL-SSL
	100-41-4	Ethylbenzene	2.0E-03 J	2.0E-03 J	MG/KG	CAA03-SB05-1109B	1/15	0.005 - 0.01275	2.0E-03	N/A	N/A	5.4E+00 C	NO	1.7E-03	YES	ASL-SSL
	98-82-8	Isopropylbenzene	9.0E-03 J	9.0E-03 J	MG/KG	CAA03-SB05-1109B	1/14	0.005 - 0.01	9.0E-03	N/A	N/A	2.1E+02 NS	NO	1.1E+00	NO	BSL
	m&pXYLENE	m- and p-Xylene	3.0E-03 J	1.9E-02 J	MG/KG	CAA03-SB05-1109B	2/14	0.01 - 0.022	1.9E-02	N/A	N/A	6.3E+01 NS	NO	N/A	N/A	BSL
	108-87-2	Methylcyclohexane	2.0E-03 J	6.0E-03 J	MG/KG	CAA03-SB05-1109B	2/14	0.005 - 0.01	6.0E-03	N/A	N/A	N/A	N/A	N/A	N/A	NTX
	75-09-2	Methylene chloride	1.2E-02 J	1.9E-02 J	MG/KG	CAA03-SB02-1109B	5/15	0.02 - 0.05	1.9E-02	N/A	N/A	1.1E+01 C	NO	1.2E-03	YES	ASL-SSL
	95-47-6	o-Xylene	5.0E-03 J	5.0E-03 J	MG/KG	CAA03-SB05-1109B	1/14	0.005 - 0.01	5.0E-03	N/A	N/A	3.8E+02 NS	NO	1.2E+00	NO	BSL
	100-42-5	Styrene	2.0E-03 J	2.0E-03 J	MG/KG	CAA03-SB08-1109	1/15	0.005 - 0.01275	2.0E-03	N/A	N/A	6.3E+02 NS	NO	1.8E+00	NO	BSL
	108-88-3	Toluene	2.0E-03 J	5.0E-03 J	MG/KG	CAA03-SB08P-1109	4/15	0.005 - 0.01275	5.0E-03	N/A	N/A	5.0E+02 NS	NO	1.6E+00	NO	BSL
	1330-20-7	Xylene, total	3.0E-03 J	2.4E-02 J	MG/KG	CAA03-SB05-1109B	2/15	0.01275 - 0.03	2.4E-02	N/A	N/A	6.3E+01 NS	NO	2.0E-01	NO	BSL
	92-52-4	1,1-Biphenyl	6.9E-01	6.9E-01	MG/KG	CAA03-SB04-1109B	1/14	0.29 - 0.54	6.9E-01	N/A	N/A	2.1E+02 NS	NO	1.9E+01	NO	BSL
	91-57-6	2-Methylnaphthalene	3.6E-03 J	1.6E+00	MG/KG	CAA03-SB04-1109B	7/15	0.018 - 3.8	1.6E+00	N/A	N/A	3.1E+01 N	NO	7.5E-01	YES	ASL-SSL
	83-32-9	Acenaphthene	5.9E-03 J	6.6E-01	MG/KG	CAA03-SB04-1109B	9/15	0.018 - 3.8	6.6E-01	N/A	N/A	3.4E+02 N	NO	2.2E+01	NO	BSL
	208-96-8	Acenaphthylene	8.8E-03 J	3.9E-01 J	MG/KG	CAA03-SB04-1109B	8/15	0.018 - 3.8	3.9E-01	N/A	N/A	3.4E+02 N	NO	N/A	N/A	BSL
	120-12-7	Anthracene	1.7E-02 J	2.4E+00	MG/KG	CAA03-SB04-1109B	9/15	0.018 - 3.8	2.4E+00	N/A	N/A	1.7E+03 N	NO	3.6E+02	NO	BSL
	56-55-3	**Benzo(a)anthracene**	**8.0E-03 J**	**2.7E+00**	**MG/KG**	**CAA03-SB04-1109B**	**13/15**	**0.018 - 0.61**	**2.7E+00**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**1.0E-02**	**YES**	**ASL-RSL, ASL-SSL**
	50-32-8	**Benzo(a)pyrene**	**5.3E-03 J**	**1.7E+00**	**MG/KG**	**CAA03-SB04-1109B**	**12/15**	**0.018 - 0.61**	**1.7E+00**	**N/A**	**N/A**	**1.5E-02 C**	**YES**	**3.5E-03**	**YES**	**ASL-RSL, ASL-SSL**
	205-99-2	**Benzo(b)fluoranthene**	**8.9E-03 J**	**2.3E+00**	**MG/KG**	**CAA03-SB07-1109**	**12/15**	**0.018 - 0.61**	**2.3E+00**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**3.5E-02**	**YES**	**ASL-RSL, ASL-SSL**
	191-24-2	Benzo(g,h,i)perylene	2.7E-02 L	5.6E-01 J	MG/KG	CAA03-SB07-1109	9/13	0.021 - 0.61	5.6E-01	N/A	N/A	1.7E+02 N	NO	N/A	N/A	BSL
	207-08-9	Benzo(k)fluoranthene	9.8E-03 J	9.1E-01	MG/KG	CAA03-SB04-1109B	10/15	0.018 - 0.76	9.1E-01	N/A	N/A	1.5E+00 C	NO	3.5E-01	YES	ASL-SSL
	117-81-7	bis(2-Ethylhexyl)phthalate	4.1E-02 J	6.6E-01 J	MG/KG	CAA03-SB02-1109B	5/15	0.089 - 3.8	6.6E-01	N/A	N/A	3.5E+01 C*	NO	1.1E+00	NO	BSL
	86-74-8	Carbazole	1.7E-02 J	2.4E+00	MG/KG	CAA03-SB04-1109B	9/15	0.018 - 3.8	2.4E+00	N/A	N/A	N/A	N/A	N/A	N/A	NTX
	218-01-9	Chrysene	1.8E-02 J	2.0E+00	MG/KG	CAA03-SB04-1109B	11/15	0.018 - 0.62	2.0E+00	N/A	N/A	1.5E+01 C	NO	1.1E+00	YES	ASL-SSL
	53-70-3	**Dibenz(a,h)anthracene**	**4.2E-03 J**	**3.3E-01 K**	**MG/KG**	**CAA03-SB04-1109B**	**9/15**	**0.018 - 3.8**	**3.3E-01**	**N/A**	**N/A**	**1.5E-02 C**	**YES**	**1.1E-02**	**YES**	**ASL-RSL, ASL-SSL**
	132-64-9	Dibenzofuran	1.2E-01 J	2.0E+00	MG/KG	CAA03-SB04-1109B	5/15	0.29 - 3.8	2.0E+00	N/A	N/A	7.8E+00 N	NO	6.8E-01	YES	ASL-SSL
	206-44-0	Fluoranthene	4.5E-03 J	6.0E+00	MG/KG	CAA03-SB04-1109B	11/15	0.018 - 0.88	6.0E+00	N/A	N/A	2.3E+02 N	NO	1.6E+02	NO	BSL
	86-73-7	Fluorene	1.2E-02 J	2.0E+00	MG/KG	CAA03-SB04-1109B	9/15	0.018 - 3.8	2.0E+00	N/A	N/A	2.3E+02 N	NO	2.7E+01	NO	BSL
	118-74-1	Hexachlorobenzene	7.2E-03 J	7.2E-03 J	MG/KG	CAA03-SB08P-1109	1/15	0.018 - 3.8	7.2E-03	N/A	N/A	3.0E-01 C	NO	5.3E-04	YES	ASL-SSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	**1.4E-02 J**	**1.4E+00 K**	**MG/KG**	**CAA03-SB01-1109**	**10/15**	**0.018 - 3.8**	**1.4E+00**	**N/A**	**N/A**	**1.5E-01 C**	**YES**	**1.2E-01**	**YES**	**ASL-RSL, ASL-SSL**
	91-20-3	**Naphthalene**	**7.4E-03 J**	**8.0E+00**	**MG/KG**	**CAA03-SB04-1109B**	**8/15**	**0.018 - 3.8**	**8.0E+00**	**N/A**	**N/A**	**3.6E+00 C***	**YES**	**4.7E-04**	**YES**	**ASL-RSL, ASL-SSL**
	85-01-8	Phenanthrene	4.8E-02	8.0E+00	MG/KG	CAA03-SB04-1109B	10/15	0.018 - 0.61	8.0E+00	N/A	N/A	1.7E+03 N	NO	N/A	N/A	BSL
	129-00-0	Pyrene	4.1E-03 J	4.1E+00	MG/KG	CAA03-SB04-1109B	12/15	0.018 - 0.67	4.1E+00	N/A	N/A	1.7E+02 N	NO	1.2E+02	NO	BSL
	72-54-8	4,4'-DDD	1.1E-03 J	1.7E-01 J	MG/KG	CAA03-SB04-1109B	11/15	0.0034 - 0.01	1.7E-01	N/A	N/A	2.0E+00 C	NO	6.6E-02	YES	ASL-SSL
	72-55-9	4,4'-DDE	1.2E-03 J	1.5E-01 J	MG/KG	CAA03-SB04-1109B	10/15	0.0034 - 0.01	1.5E-01	N/A	N/A	1.4E+00 C	NO	4.7E-02	YES	ASL-SSL
	50-29-3	4,4'-DDT	1.8E-03 J	3.2E-02	MG/KG	CAA03-SB07-1109	7/15	0.0034 - 0.0084	3.2E-02	N/A	N/A	1.7E+00 C*	NO	6.7E-02	NO	BSL
	309-00-2	Aldrin	1.1E-03 J	1.2E-03 J	MG/KG	CAA03-SB02-1109B	2/15	0.0018 - 0.0027	1.2E-03	N/A	N/A	2.9E-02 C*	NO	6.5E-04	YES	ASL-SSL
	5103-71-9	alpha-Chlordane	8.9E-04 J	4.0E-03 J	MG/KG	CAA03-SB04-1109B	2/15	0.0018 - 0.0027	4.0E-03	N/A	N/A	1.6E+00 C*	NO	N/A	N/A	BSL

Table 2.2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3
Cheatham Annex, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	319-86-8	delta-BHC	1.3E-03 J	1.4E-03 J	MG/KG	CAA03-SB06-1109	2/15	0.0018 - 0.0027	1.4E-03	N/A	N/A	2.7E-01 C	N/A	N/A	N/A	BBK
	60-57-1	**Dieldrin**	**6.5E-04 J**	**3.0E-02 J**	**MG/KG**	**CAA03-SB04-1109B**	**7/15**	**0.0034 - 0.0053**	**3.0E-02**	**N/A**	**N/A**	**3.0E-02 C**	**YES**	**1.7E-04**	**YES**	**ASL-RSL, ASL-SSL**
	1031-07-8	Endosulfan sulfate	2.7E-03 J	9.2E-03 J	MG/KG	CAA03-SB07-1109	2/15	0.0034 - 0.0053	9.2E-03	N/A	N/A	3.7E+01 N	NO	N/A	N/A	BSL
	72-20-8	Endrin	8.6E-03 J	9.6E-02 J	MG/KG	CAA03-SB08-1109	4/15	0.0034 - 0.0078	9.6E-02	N/A	N/A	1.8E+00 N	NO	4.4E-01	NO	BSL
	7421-93-4	Endrin aldehyde	2.9E-03 J	2.9E-03 J	MG/KG	CAA03-SB04-1109B	1/15	0.0034 - 0.0053	2.9E-03	N/A	N/A	1.8E+00 N	NO	N/A	N/A	BSL
	53494-70-5	Endrin ketone	8.8E-04 J	8.8E-04 J	MG/KG	CAA03-SB08-1109	1/15	0.0034 - 0.0053	8.8E-04	N/A	N/A	1.8E+00 N	NO	N/A	N/A	BSL
	58-89-9	gamma-BHC (Lindane)	5.7E-04 J	6.4E-03 J	MG/KG	CAA03-SB01-1109 : CAA03-SB02-1109B	8/15	0.0018 - 0.0027	6.4E-03	N/A	N/A	5.2E-01 C*	NO	3.6E-04	YES	ASL-SSL
	5103-74-2	gamma-Chlordane	1.0E-03 J	2.3E-02 J	MG/KG	CAA03-SB07-1109	3/15	0.0018 - 0.0027	2.3E-02	N/A	N/A	1.6E+00 C*	NO	N/A	N/A	BSL
	7429-90-5	**Aluminum**	**2.8E+03**	**2.9E+04**	**MG/KG**	**CAA03-SB02-1109B**	**15/15**	**20 - 3550**	**2.9E+04**	**1.3E+04**	**YES**	**7.7E+03 N**	**YES**	**5.5E+04**	**NO**	**ASL-Res**
	7440-36-0	Antimony	4.0E-02 J	1.2E+00 L	MG/KG	CAA03-SB03-1109B	14/15	0.065 - 1.1	1.2E+00	ND	YES	3.1E+00 N	NO	6.6E-01	YES	ASL-SSL
	7440-38-2	**Arsenic**	**7.1E-01**	**2.1E+01**	**MG/KG**	**CAA03-SB03-1109B**	**15/15**	**0.32 - 4.2**	**2.1E+01**	**5.5E+00**	**YES**	**3.9E-01 C***	**YES**	**1.3E-03**	**YES**	**ASL-RSL, ASL-SSL**
	7440-39-3	Barium	9.0E+00 J	7.2E+01 J	MG/KG	CAA03-SB03-1109B	15/15	0.32 - 33.2	7.2E+01	8.5E+01	NO	1.5E+03 N	N/A	3.0E+02	N/A	BBK
	7440-41-7	Beryllium	1.8E-01 J	1.4E+00	MG/KG	CAA03-SB02-1109B	14/15	0.32 - 0.69	1.4E+00	5.2E-01	YES	1.6E+01 N	NO	5.8E+01	NO	BSL
	7440-43-9	Cadmium	3.0E-02 J	2.0E-01 J	MG/KG	CAA03-SB04-1109B	7/15	0.15 - 2.2	2.0E-01	ND	YES	7.0E+00 N	NO	1.4E+00	NO	BSL
	7440-70-2	Calcium	1.1E+02	1.3E+04 J	MG/KG	CAA03-SB06-1109	15/15	4.6 - 2460	1.3E+04	2.4E+03	YES	N/A	NUT	N/A	NUT	NUT
	7440-47-3	**Chromium**	**6.0E+00**	**5.0E+01**	**MG/KG**	**CAA03-SB02-1109B**	**15/15**	**0.98 - 29.2**	**5.0E+01**	**3.4E+01**	**YES**	**2.9E-01 C**	**YES**	**8.3E-04**	**YES**	**ASL-RSL, ASL-SSL**
	7440-48-4	**Cobalt**	**6.8E-01**	**9.8E+00**	**MG/KG**	**CAA03-SB02-1109B**	**15/15**	**0.065 - 3.6**	**9.8E+00**	**5.2E+00**	**YES**	**2.3E+00 N**	**YES**	**4.9E-01**	**YES**	**ASL-RSL, ASL-SSL**
	7440-50-8	Copper	1.4E+00 J	1.9E+01	MG/KG	CAS004-4-HA06-02-1199	14/15	1.6 - 19.4	1.9E+01	3.2E+00	YES	3.1E+02 N	NO	5.1E+01	NO	BSL
	7439-89-6	Iron	2.9E+03 J	3.2E+04	MG/KG	CAA03-SB09-1109	15/15	6.5 - 28000	3.2E+04	3.2E+04	NO	5.5E+03 N	N/A	6.4E+02	N/A	BBK
	7439-92-1	Lead	3.5E+00	3.0E+01	MG/KG	CAS004-4-HA06-02-1199	15/15	0.32 - 29.7	3.0E+01	8.8E+00	YES	4.0E+02 NL	NO	N/A	N/A	BSL
	7439-95-4	Magnesium	3.5E+02 J	7.1E+03 J	MG/KG	CAA03-SB02-1109B	15/15	3.2 - 1730	7.1E+03	1.1E+03	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	**Manganese**	**1.3E+01 J**	**4.1E+02 J**	**MG/KG**	**CAA03-SB02-1109B**	**15/15**	**0.32 - 114**	**4.1E+02**	**1.8E+02**	**YES**	**1.8E+02 N**	**YES**	**5.7E+01**	**YES**	**ASL-RSL, ASL-SSL**
	7439-97-6	Mercury	1.0E-02 J	6.0E-02	MG/KG	CAA03-SB02-1109A : CAA03-SB03-1109B	13/15	0.032 - 0.054	6.0E-02	1.4E-01	NO	2.3E+00 N	N/A	3.0E-02	N/A	BBK
	7440-02-0	Nickel	1.4E+00 J	3.2E+01	MG/KG	CAA03-SB03-1109B	15/15	2.6 - 20.4	3.2E+01	1.8E+01	YES	1.5E+02 N	NO	4.8E+01	NO	BSL
	7440-09-7	Potassium	2.4E+02	4.8E+03 K	MG/KG	CAA03-SB02-1109B	14/15	65 - 920	4.8E+03	9.0E+02	YES	N/A	NUT	N/A	NUT	NUT
	7782-49-2	Selenium	1.3E-01 J	7.1E-01	MG/KG	CAA03-SB02-1109B	14/15	0.32 - 0.69	7.1E-01	6.4E-01	YES	3.9E+01 N	NO	9.5E-01	NO	BSL
	7440-22-4	Silver	4.4E-01 J	8.5E+00 L	MG/KG	CAS004-4-HA06-02-1199	3/15	0.98 - 8.5	8.5E+00	1.1E+00	YES	3.9E+01 N	NO	1.6E+00	YES	ASL-SSL
	7440-23-5	Sodium	1.3E+01 J	6.9E+02 K	MG/KG	CAA03-SB02-1109B	14/15	31 - 140	6.9E+02	8.1E+02	NO	N/A	N/A	N/A	N/A	BBK
	7440-62-2	**Vanadium**	**6.5E+00**	**5.7E+01**	**MG/KG**	**CAA03-SB09-1109**	**15/15**	**0.32 - 20.8**	**5.7E+01**	**4.8E+01**	**YES**	**3.9E+01 N**	**YES**	**2.6E+00**	**YES**	**ASL-RSL, ASL-SSL**
	7440-66-6	Zinc	6.9E+00	2.4E+02	MG/KG	CAS004-4-HA06-02-1199	15/15	1.6 - 236	2.4E+02	2.8E+01	YES	2.3E+03 N	NO	6.8E+02	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and SSLs.
[4] Background values from CAX/Yorktown subsurface soil background soil; values represent the 95% UTL.
[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
RSL value for xylenes, total used as surrogate for m,p-xylenes.
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.

COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
NE = Not established.

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] SSL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection

RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical-HCH used as surrogate for delta-BHC.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde and endrin ketone.

[6] Risk-based Soil Screening Levels. ORNL. December 2009. Regional Screening Levels for Chemical Contaminants at Superfund Sites. Available Online: http://epa-prgs.ornl.gov/chemicals/index.shtml

[7] Rationale Codes

Selection Reason:
- Above Regional Screening Level (ASL-RSL)
- Above Soil Screening Level (ASL-SSL), not evaluated quantitatively
- No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason:
- Below Background (BBK)
- Below Screening Level (BSL)
- Essential Nutrient (NUT)

ND = Not detected
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level
SSL = Soil Screening Levels
RSL = Regional Screening Levels

TABLE 2.2a

Step 2 Soil Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex, Williamsburg, Virginia

AOC 3 - Subsurface Soil

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)anthracene	13 / 15	2.7E+00	CAA03-SB04-1109B	1.5E-01	1E-06	NA	2E-05	NA
Benzo(a)pyrene	12 / 15	1.7E+00	CAA03-SB04-1109B	1.5E-02	1E-06	NA	1E-04	NA
Benzo(b)fluoranthene	12 / 15	2.3E+00	CAA03-SB07-1109	1.5E-01	1E-06	NA	2E-05	NA
Dibenz(a,h)anthracene	9 / 15	3.3E-01 K	CAA03-SB04-1109B	1.5E-02	1E-06	NA	2E-05	NA
Indeno(1,2,3-cd)pyrene	10 / 15	1.4E+00 K	CAA03-SB01-1109	1.5E-01	1E-06	NA	9E-06	NA
Naphthalene	8 / 15	8.0E+00	CAA03-SB04-1109B	3.6E+00	1E-06	NA	2E-06	NA
Pesticides (mg/kg)								
Dieldrin	15 / 15	3.0E-02 J	CAA03-SB04-1109B	3.0E-02	1E-06	NA	1E-06	NA
Metals (mg/kg)								
Aluminum	15 / 15	2.9E+04	CAA03-SB02-1109B	7.7E+04	1	0.4	NA	Developmental, Neurological
Arsenic	15 / 15	2.1E+01	CAA03-SB03-1109B	3.9E-01	1E-06	NA	5E-05	NA
Chromium	15 / 15	5.0E+01	CAA03-SB02-1109B	2.9E-01	1E-06	NA	2E-04	NA
Cobalt	15 / 15	9.8E+00	CAA03-SB02-1109B	2.3E+01	1	0.4	NA	Thyroid
Manganese	15 / 15	4.1E+02 J	CAA03-SB02-1109B	1.8E+03	1	0.2	NA	CNS
Vanadium	15 / 15	5.7E+01	CAA03-SB09-1109	3.9E+02	1	0.1	NA	Hair Cystine
Cumulative Corresponding Hazard Index[c]						**1**		
Cumulative Corresponding Cancer Risk[d]							**4E-04**	

Total Developmental HI =	0.4
Total Neurological/CNS HI =	**0.6**
Total Thyroid HI =	0.4
Total Gastrointestinal HI =	0.2
Total Hair Cystine HI =	0.1

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

K = Biased High

mg/kg = milligrams per kilogram

NA = Not available/not applicable

Table 2.2b

Step 3 Soil Screening - Risk Ratio, 95% UCL

Cheatham Annex, Williamsburg, Virginia

AOC 3 - Subsurface Soil

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)									
Benzo(a)anthracene	13 / 15	1.6E+00	95% KM	1, 3	1.5E-01	1E-06	NA	1E-05	NA
Benzo(a)pyrene	12 / 15	6.9E-01	95% KM-t	1, 2, 3	1.5E-02	1E-06	NA	5E-05	NA
Benzo(b)fluoranthene	12 / 15	1.5E+00	95% KM	1, 3	1.5E-01	1E-06	NA	1E-05	NA
Dibenz(a,h)anthracene	9 / 15	1.3E-01	95% KM-t	1, 2, 3	1.5E-02	1E-06	NA	9E-06	NA
Indeno(1,2,3-cd)pyrene	10 / 15	5.5E-01	95% KM-BCA	1, 3	1.5E-01	1E-06	NA	4E-06	NA
Naphthalene	8 / 15	1.9E+00	95% KM-BCA	1, 3	3.6E+00	1E-06	NA	5E-07	NA
Pesticides (mg/kg)									
Dieldrin	15 / 15	7.4E-03	95% KM-BCA	1	3.0E-02	1E-06	NA	2E-07	NA
Metals (mg/kg)									
Aluminum	15 / 15	1.6E+04	95% Stud-t	1, 2, 3	7.7E+04	1	0.2	NA	Developmental, Neurological
Arsenic	15 / 15	7.8E+00	G-App	1, 3	3.9E-01	1E-06	NA	2E-05	NA
Chromium	15 / 15	2.8E+01	95% Stud-t	1, 2, 3	2.9E-01	1E-06	NA	1E-04	NA
Manganese	15 / 15	1.6E+02	G-App	1, 3	1.8E+03	1	0.1	NA	CNS
Cumulative Corresponding Hazard Index[c]							**0.3**		
Cumulative Corresponding Cancer Risk[d]								**2E-04**	
								Total Developmental HI =	0.2
								Total Neurological/CNS HI =	0.3

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram

HI = Hazard Index

UCL = Upper Confidence Limit

RSL = Regional Screening Level

NA = Not available/not applicable

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations

in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (M); 99% Kaplan-Meier Chebyshev (99% KM); 95% Kaplan-Meier (t) UCL (95% KM-t); 95% Kaplan-Meier (percentile Bootstrap) (95% KM-b);

95% Kaplan-Meier (BCA) UCL (95% KM-BCA); 95% Kaplan-Meier Chebyshev (95% KM); 95% Chebyshev (mean, std) UCL (95% Cheb-m); Approximate Gamma UCL (G-App); 95% Student's-T test UCL (95% Stud-t);

99% Chebyshev (Mean, Sd) UCL (99% Cheb-m); 97.5% Kaplan-Meier Chebyshev UCL (97.5% KM)

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

Table 2.3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] MCL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Groundwater AOC 3	95-50-1	1,2-Dichlorobenzene	2.0E-01 J	2.0E-01 J	UG/L	CAA03-GW03-1109	1/5	1 - 1	2.0E-01	N/A	N/A	3.7E+01 N	NO	6.0E+02	NO	BSL
	106-46-7	**1,4-Dichlorobenzene**	**2.0E+00 J**	**2.0E+00 J**	**UG/L**	**CAA03-GW03-1109**	**1/5**	**1 - 1**	**2.0E+00**	**N/A**	**N/A**	**4.3E-01 C**	**YES**	**7.5E+01**	**NO**	**ASL-RSL**
	71-43-2	**Benzene**	**1.4E+01**	**1.4E+01**	**UG/L**	**CAA03-GW05-1109**	**1/5**	**1 - 1**	**1.4E+01**	**N/A**	**N/A**	**4.1E-01 C**	**YES**	**5.0E+00**	**YES**	**ASL-RSL, ASL-MCL**
	110-82-7	Cyclohexane	1.2E+01	1.2E+01	UG/L	CAA03-GW05-1109	1/5	1 - 1	1.2E+01	N/A	N/A	1.3E+03 N	NO	N/A	N/A	BSL
	100-41-4	**Ethylbenzene**	**2.0E-01 J**	**1.0E+01**	**UG/L**	**CAA03-GW05-1109**	**2/5**	**1 - 1**	**1.0E+01**	**N/A**	**N/A**	**1.5E+00 C**	**YES**	**7.0E+02**	**NO**	**ASL-RSL**
	98-82-8	Isopropylbenzene	4.0E+00	4.0E+00	UG/L	CAA03-GW05-1109	1/5	1 - 1	4.0E+00	N/A	N/A	6.8E+01 N	NO	N/A	N/A	BSL
	m&pXYLENE	**m- and p-Xylene**	**1.0E+00 J**	**2.0E+01**	**UG/L**	**CAA03-GW05-1109**	**2/5**	**2 - 2**	**2.0E+01**	**N/A**	**N/A**	**2.0E+01 N**	**YES**	**1.0E+04**	**NO**	**ASL-RSL**
	108-87-2	Methylcyclohexane	1.1E+01	1.1E+01	UG/L	CAA03-GW05-1109	1/5	1 - 1	1.1E+01	N/A	N/A	N/A	N/A	N/A	N/A	NTX
	1634-04-4	Methyl-tert-butyl ether (MTBE)	3.0E+00	3.0E+00	UG/L	CAA03-GW01-1109	1/5	2 - 2	3.0E+00	N/A	N/A	1.2E+01 C	NO	N/A	N/A	BSL
	95-47-6	o-Xylene	4.0E-01 J	5.0E+00	UG/L	CAA03-GW05-1109	2/5	1 - 1	5.0E+00	N/A	N/A	1.2E+02 N	NO	N/A	N/A	BSL
	100-42-5	Styrene	5.0E-01 J	5.0E-01 J	UG/L	CAA03-GW05-1109	1/5	1 - 1	5.0E-01	N/A	N/A	1.6E+02 N	NO	1.0E+02	NO	BSL
	108-88-3	Toluene	2.0E+00	2.0E+00	UG/L	CAA03-GW05-1109	1/5	1 - 1	2.0E+00	N/A	N/A	2.3E+02 N	NO	1.0E+03	NO	BSL
	1330-20-7	**Xylene, total**	**2.0E+00 J**	**2.5E+01**	**UG/L**	**CAA03-GW05-1109**	**2/5**	**3 - 3**	**2.5E+01**	**N/A**	**N/A**	**2.0E+01 N**	**YES**	**1.0E+04**	**NO**	**ASL-RSL**
	92-52-4	1,1-Biphenyl	8.0E+00 J	8.0E+00 J	UG/L	CAA03-GW05-1109	1/5	9 - 12	8.0E+00	N/A	N/A	1.8E+02 N	NO	N/A	N/A	BSL
	105-67-9	2,4-Dimethylphenol	2.9E+01	2.9E+01	UG/L	CAA03-GW05-1109	1/5	13 - 17	2.9E+01	N/A	N/A	7.3E+01 N	NO	N/A	N/A	BSL
	91-57-6	**2-Methylnaphthalene**	**1.5E+00**	**3.2E+01**	**UG/L**	**CAA03-GW05-1109**	**3/5**	**0.2 - 29**	**3.2E+01**	**N/A**	**N/A**	**1.5E+01 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	m&pCRESOL	3- and 4-Methylphenol	1.2E+01 J	1.2E+01 J	UG/L	CAA03-GW05-1109	1/5	16 - 20	1.2E+01	N/A	N/A	1.8E+01 N	NO	N/A	N/A	BSL
	83-32-9	Acenaphthene	5.4E-01	8.9E+00 J	UG/L	CAA03-GW05-1109	3/5	0.19 - 23	8.9E+00	N/A	N/A	2.2E+02 N	NO	N/A	N/A	BSL
	208-96-8	Acenaphthylene	2.6E-01 J	4.8E+00	UG/L	CAA03-GW05-1109	3/5	0.19 - 0.57	4.8E+00	N/A	N/A	2.2E+02 N	NO	N/A	N/A	BSL
	120-12-7	Anthracene	2.6E-01	6.7E+00	UG/L	CAA03-GW05-1109	3/5	0.19 - 0.57	6.7E+00	N/A	N/A	1.1E+03 N	NO	N/A	N/A	BSL
	100-52-7	Benzaldehyde	2.0E+00 J	2.0E+00 J	UG/L	CAA03-GW05-1109	1/5	9 - 12	2.0E+00	N/A	N/A	3.7E+02 N	NO	N/A	N/A	BSL
	56-55-3	**Benzo(a)anthracene**	**2.9E-01**	**2.9E+00**	**UG/L**	**CAA03-GW05-1109**	**3/5**	**0.19 - 0.57**	**2.9E+00**	**N/A**	**N/A**	**2.9E-02 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	50-32-8	**Benzo(a)pyrene**	**1.0E-01 J**	**2.0E+00**	**UG/L**	**CAA03-GW05-1109**	**4/5**	**0.19 - 0.57**	**2.0E+00**	**N/A**	**N/A**	**2.9E-03 C**	**YES**	**2.0E-01**	**YES**	**ASL-RSL, ASL-MCL**
	205-99-2	**Benzo(b)fluoranthene**	**1.5E-01 J**	**2.7E+00**	**UG/L**	**CAA03-GW05-1109**	**3/5**	**0.2 - 0.85**	**2.7E+00**	**N/A**	**N/A**	**2.9E-02 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	191-24-2	Benzo(g,h,i)perylene	8.3E-02 J	1.2E+00	UG/L	CAA03-GW05-1109	3/5	0.19 - 0.57	1.2E+00	N/A	N/A	1.1E+02 N	NO	N/A	N/A	BSL
	207-08-9	**Benzo(k)fluoranthene**	**9.2E-01**	**9.4E-01**	**UG/L**	**CAA03-GW05-1109**	**2/5**	**0.19 - 0.57**	**9.4E-01**	**N/A**	**N/A**	**2.9E-01 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	86-74-8	Carbazole	4.3E+00	8.6E+00 J	UG/L	CAA03-GW04-1109	2/5	0.2 - 1.7	8.6E+00	N/A	N/A	N/A	N/A	N/A	N/A	NTX
	218-01-9	Chrysene	2.1E+00	2.1E+00	UG/L	CAA03-GW05-1109	1/5	0.19 - 0.57	2.1E+00	N/A	N/A	2.9E+00 C	NO	N/A	N/A	BSL
	53-70-3	**Dibenz(a,h)anthracene**	**2.1E-01 J**	**2.6E-01 J**	**UG/L**	**CAA03-GW05-1109**	**2/5**	**0.2 - 0.71**	**2.6E-01**	**N/A**	**N/A**	**2.9E-03 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	132-64-9	**Dibenzofuran**	**3.0E+00 J**	**1.9E+01**	**UG/L**	**CAA03-GW05-1109**	**2/5**	**9 - 12**	**1.9E+01**	**N/A**	**N/A**	**3.7E+00 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	206-44-0	Fluoranthene	5.2E-01	8.6E+00 J	UG/L	CAA03-GW05-1109	3/5	0.2 - 29	8.6E+00	N/A	N/A	1.5E+02 N	NO	N/A	N/A	BSL
	86-73-7	Fluorene	9.8E-01	2.1E+01 J	UG/L	CAA03-GW05-1109	3/5	0.19 - 23	2.1E+01	N/A	N/A	1.5E+02 N	NO	N/A	N/A	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	**1.2E+00 J**	**1.2E+00 J**	**UG/L**	**CAA03-GW05-1109**	**1/5**	**0.19 - 0.57**	**1.2E+00**	**N/A**	**N/A**	**2.9E-02 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	91-20-3	**Naphthalene**	**1.1E+01**	**5.6E+02**	**UG/L**	**CAA03-GW05-1109**	**3/5**	**0.2 - 23**	**5.6E+02**	**N/A**	**N/A**	**1.4E-01 C***	**YES**	**N/A**	**N/A**	**ASL-RSL**
	85-01-8	Phenanthrene	1.6E+00	3.6E+01	UG/L	CAA03-GW05-1109	3/5	0.19 - 23	3.6E+01	N/A	N/A	1.1E+03 N	NO	N/A	N/A	BSL
	108-95-2	Phenol	5.0E+00 J	5.0E+00 J	UG/L	CAA03-GW05-1109	1/5	9 - 12	5.0E+00	N/A	N/A	1.1E+03 N	NO	N/A	N/A	BSL
	129-00-0	Pyrene	4.2E-01	6.3E+00	UG/L	CAA03-GW05-1109	3/5	0.19 - 0.57	6.3E+00	N/A	N/A	1.1E+02 N	NO	N/A	N/A	BSL
	72-55-9	4,4'-DDE	1.3E-02 J	1.3E-02 J	UG/L	CAA03-GW04-1109	1/5	0.098 - 0.12	1.3E-02	ND	YES	2.0E-01 C	NO	N/A	N/A	BSL
	60-57-1	**Dieldrin**	**1.7E-02 J**	**1.7E-02 J**	**UG/L**	**CAA03-GW04-1109**	**1/5**	**0.098 - 0.12**	**1.7E-02**	**ND**	**YES**	**4.2E-03 C**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7429-90-5	**Aluminum**	**3.6E+02**	**2.3E+04**	**UG/L**	**CAA03-GW03-1109**	**5/5**	**300 - 300**	**2.3E+04**	**2.2E+03**	**YES**	**3.7E+03 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7440-36-0	Antimony	3.5E-01 J	6.7E-01 J	UG/L	CAA03-GW02-1109	5/5	1 - 1	6.7E-01	1.9E+01	NO	1.5E+00 N	N/A	6.0E+00	N/A	BBK
	7440-38-2	**Arsenic**	**4.8E+00 J**	**5.4E+01**	**UG/L**	**CAA03-GW03-1109**	**5/5**	**5 - 5**	**5.4E+01**	**2.3E+00**	**YES**	**4.5E-02 C**	**YES**	**1.0E+01**	**YES**	**ASL-RSL, ASL-MCL**

Table 2.3

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Screening [3] Background [4] Value	COPC Flag	Screening [3] Toxicity [5] Value	COPC Flag	Screening [3] MCL [6] Value	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
	7440-39-3	Barium	2.6E+01	3.0E+02	UG/L	CAA03-GW05-1109	5/5	5 - 5	3.0E+02	1.2E+02	YES	7.3E+02 N	NO	2.0E+03	NO	BSL
	7440-41-7	Beryllium	1.1E-01 J	1.4E+00	UG/L	CAA03-GW03-1109	4/5	1 - 1	1.4E+00	2.5E+00	NO	7.3E+00 N	N/A	4.0E+00	N/A	BBK
	7440-43-9	Cadmium	9.0E-02 J	3.1E-01 J	UG/L	CAA03-GW01-1109	4/5	1 - 1	3.1E-01	6.1E-01	NO	1.8E+00 N	N/A	5.0E+00	N/A	BBK
	7440-70-2	Calcium	8.7E+04	1.5E+05	UG/L	CAA03-GW01-1109	5/5	50 - 50	1.5E+05	1.7E+05	NO	N/A	N/A	N/A	N/A	BBK
	7440-47-3	**Chromium**	**2.8E+00 J**	**4.5E+01**	**UG/L**	**CAA03-GW03-1109**	**5/5**	**15 - 15**	**4.5E+01**	**1.5E+01**	**YES**	**4.3E-02 C**	**YES**	**1.0E+02**	**NO**	**ASL-RSL**
	7440-48-4	Cobalt	9.1E-01 J	5.1E+00 J	UG/L	CAA03-GW03-1109	4/5	30 - 30	5.1E+00	2.1E+01	NO	1.1E+00 N	N/A	N/A	N/A	BBK
	7440-50-8	Copper	2.0E+00 J	1.4E+01 J	UG/L	CAA03-GW01-1109	4/5	25 - 25	1.4E+01	1.2E+01	YES	1.5E+02 N	NO	1.3E+03	NO	BSL
	7439-89-6	**Iron**	**4.7E+03**	**3.9E+04**	**UG/L**	**CAA03-GW05-1109**	**5/5**	**100 - 100**	**3.9E+04**	**8.9E+02**	**YES**	**2.6E+03 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7439-92-1	Lead	1.6E+00 J	1.9E+01	UG/L	CAA03-GW02-1109	5/5	5 - 5	1.9E+01	2.1E+01	NO	N/A	N/A	1.5E+01	N/A	BBK
	7439-95-4	Magnesium	3.6E+03	2.0E+04	UG/L	CAA03-GW02-1109	5/5	50 - 50	2.0E+04	1.2E+04	YES	N/A	NUT	N/A	NUT	NUT
	7439-96-5	**Manganese**	**5.1E+01**	**6.4E+02**	**UG/L**	**CAA03-GW02-1109**	**5/5**	**5 - 5**	**6.4E+02**	**5.8E+01**	**YES**	**8.8E+01 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7439-97-6	**Mercury**	**3.0E-02 J**	**2.3E+00**	**UG/L**	**CAA03-GW05-1109**	**3/5**	**0.2 - 0.2**	**2.3E+00**	**8.1E-02**	**YES**	**1.1E+00 N**	**YES**	**2.0E+00**	**YES**	**ASL-RSL, ASL-MCL**
	7440-02-0	Nickel	1.9E+00 J	1.3E+01 J	UG/L	CAA03-GW03-1109	5/5	40 - 40	1.3E+01	1.1E+01	YES	7.3E+01 N	NO	N/A	N/A	BSL
	7440-09-7	Potassium	2.0E+03	1.7E+04	UG/L	CAA03-GW02-1109	5/5	1000 - 1000	1.7E+04	1.3E+04	YES	N/A	NUT	N/A	NUT	NUT
	7440-22-4	Silver	8.4E-01 J	2.2E+00 J	UG/L	CAA03-GW05-1109	3/5	15 - 15	2.2E+00	ND	YES	1.8E+01 N	NO	N/A	N/A	BSL
	7440-23-5	Sodium	7.1E+03	3.6E+04	UG/L	CAA03-GW02-1109	5/5	1000 - 1000	3.6E+04	6.5E+04	YES	N/A	NUT	N/A	NUT	NUT
	7440-62-2	**Vanadium**	**1.2E+01 J**	**5.5E+01**	**UG/L**	**CAA03-GW03-1109**	**3/5**	**25 - 25**	**5.5E+01**	**2.6E+01**	**YES**	**1.8E+01 N**	**YES**	**N/A**	**N/A**	**ASL-RSL**
	7440-66-6	Zinc	1.1E+01 J	5.6E+01	UG/L	CAA03-GW02-1109	5/5	25 - 25	5.6E+01	4.5E+00	YES	1.1E+03 N	NO	N/A	N/A	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Screening Steps: The maximium concentrations were compared to background concentrations. If exceedances, the maximim concenentrations were then compared to RSLs and MCLs.

[4] Background values from CAX/Yorktown groundwater Yorkown-Eastover Aquiver background sample group (YE); values represent the 95% UTL.

[5] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
Tap Water RSLs (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). [Online]. Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for Xylene, Total used as surrogate for m- and p-Xyelene.
RSL value for p-Cresol used as surrogate for 3- and 4-methylphenol.
RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for Chromium(VI) used as surrogate for chromium.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.

[6] Drinking water Maximum Contaminant Level (MCL) (USEPA, 2009).

[7] Rationale Codes

Selection Reason: Above Tap Water Screening Levels (ASL-RSL)
Above Maximim Contaminant Levels (ASL-MCL)
No Toxicity Information (NTX), not evaluated quantitatively

Deletion Reason: Below Background (BBK)
Below Screening Level (BSL)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
J = Estimated Value
C = Carcinogenic
C* = where: N SL < 100X C SL
N = Noncarcinogenic
N/A = Not available or Not applicable
NE = Not established.
ND = Not detected
RSL = Regional Screening Levels

TABLE 2.3a

Step 2 Groundwater Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex, Williamsburg, Virginia

AOC 3 - Groundwater

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Volatile Organic Compounds (ug/L)								
1,4-Dichlorobenzene	1 / 5	2.0E+00 J	CAA03-GW03-1109	4.3E-01	1E-06	NA	5E-06	NA
Benzene	1 / 5	1.4E+01	CAA03-GW05-1109	4.1E-01	1E-06	NA	3E-05	NA
Ethylbenzene	2 / 5	1.0E+01	CAA03-GW05-1109	1.5E+00	1E-06	NA	7E-06	NA
m- and p-Xylene	2 / 5	2.0E+01	CAA03-GW05-1109	2.0E+02	1	0.1	NA	Whole Body
Xylene, total	2 / 5	2.5E+01	CAA03-GW05-1109	2.0E+02	1	0.1	NA	Whole Body
Semivolatile Organic Compounds (ug/L)								
2-Methylnaphthalene	3 / 5	3.2E+01	CAA03-GW05-1109	1.5E+02	1	0.2	NA	Lungs
Benzo(a)anthracene	3 / 5	2.9E+00	CAA03-GW05-1109	3.0E-02	1E-06	NA	1E-04	NA
Benzo(a)pyrene	4 / 5	2.0E+00	CAA03-GW05-1109	3.0E-03	1E-06	NA	7E-04	NA
Benzo(b)fluoranthene	3 / 5	2.7E+00	CAA03-GW05-1109	3.0E-02	1E-06	NA	9E-05	NA
Benzo(k)fluoranthene	2 / 5	9.4E-01	CAA03-GW05-1109	3.0E-01	1E-06	NA	3E-06	NA
Dibenz(a,h)anthracene	2 / 5	2.6E-01 J	CAA03-GW05-1109	3.0E-03	1E-06	NA	9E-05	NA
Dibenzofuran	2 / 5	1.9E+01	CAA03-GW05-1109	3.7E+01	1	0.5	NA	Whole body, Organ Weight
Indeno(1,2,3-cd)pyrene	1 / 5	1.2E+00 J	CAA03-GW05-1109	3.0E-02	1E-06	NA	4E-05	NA
Naphthalene	3 / 5	5.6E+02	CAA03-GW05-1109	1.4E-01	1E-06	NA	4E-03	NA
Pesticides (ug/L)								
Dieldrin	1 / 5	1.7E-02 J	CAA03-GW04-1109	4.2E-03	1E-06	NA	4E-06	NA
Metals (ug/L)								
Aluminum	5 / 5	2.3E+04	CAA03-GW03-1109	3.7E+04	1	0.6	NA	Developmental, Neurological
Arsenic	5 / 5	5.4E+01	CAA03-GW03-1109	4.5E-02	1E-06	NA	1E-03	NA
Chromium	5 / 5	4.5E+01	CAA03-GW03-1109	4.3E-02	1E-06	NA	1E-03	NA
Iron	5 / 5	3.9E+04	CAA03-GW05-1109	2.6E+04	1	2	NA	Gastrointestinal
Manganese	5 / 5	6.4E+02	CAA03-GW02-1109	8.8E+02	1	0.7	NA	CNS
Mercury	3 / 5	2.3E+00	CAA03-GW05-1109	1.1E+01	1	0.2	NA	Immune System
Vanadium	3 / 5	5.5E+01	CAA03-GW03-1109	1.8E+02	1	0.3	NA	Hair Cystine
Cumulative Corresponding Hazard Index[c]						**4**		
Cumulative Corresponding Cancer Risk[d]							**7E-03**	

Total Whole Body HI =	0.2
Total Lungs HI =	0.2
Total Developmental HI =	**0.6**
Total Neurological/CNS HI =	**1**
Total Gastrointestinal HI =	**2**
Total Immune System HI =	0.2
Total Hair Cystine HI =	0.3

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central nervous System

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

µg/L = micrograms per liter

NA = Not available/not applicable

Table 2.3b
Step 3 Groundwater Screening - Risk Ratio, 95% UCL
Cheatham Annex, Williamsburg, Virginia
AOC 3 - Groundwater

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Volatile Organic Compounds (ug/L)									
1,4-Dichlorobenzene	1 / 5	2.0E+00	Max	7	4.3E-01	1E-06	NA	5E-06	NA
Benzene	1 / 5	1.4E+01	Max	7	4.1E-01	1E-06	NA	3E-05	NA
Ethylbenzene	2 / 5	1.0E+01	Max	6	1.5E+00	1E-06	NA	7E-06	NA
Semivolatile Organic Compounds (ug/L)									
Benzo(a)anthracene	3 / 5	2.2E+00	95% KM-t	1, 2	3.0E-02	1E-06	NA	7E-05	NA
Benzo(a)pyrene	4 / 5	1.8E+00	95% KM-t	1, 2, 3	3.0E-03	1E-06	NA	6E-04	NA
Benzo(b)fluoranthene	3 / 5	2.4E+00	95% KM-t	1, 2	3.0E-02	1E-06	NA	8E-05	NA
Benzo(k)fluoranthene	2 / 5	9.4E-01	95% KM-t	4	3.0E-01	1E-06	NA	3E-06	NA
Dibenz(a,h)anthracene	2 / 5	2.6E-01	95% KM-t	4	3.0E-03	1E-06	NA	9E-05	NA
Indeno(1,2,3-cd)pyrene	1 / 5	1.2E+00	Max	7	3.0E-02	1E-06	NA	4E-05	NA
Naphthalene	3 / 5	5.6E+02	Max	6	1.4E-01	1E-06	NA	4E-03	NA
Pesticides (ug/L)									
Dieldrin	1 / 5	1.7E-02	Max	7	4.2E-03	1E-06	NA	4E-06	NA
Metals (ug/L)									
Aluminum	5 / 5	1.8E+04	95% Stud-t	1, 2, 3	3.7E+04	1	0.5	NA	Developmental, Neurological
Arsenic	5 / 5	5.4E+01	Max	6	4.5E-02	1E-06	NA	1E-03	NA
Chromium	5 / 5	3.4E+01	95% Stud-t	1, 2, 3	4.3E-02	1E-06	NA	8E-04	NA
Iron	5 / 5	3.8E+04	95% Stud-t	1, 2, 3	2.6E+04	1	1	NA	Gastrointestinal
Manganese	5 / 5	5.2E+02	95% Stud-t	1, 2, 3	8.8E+02	1	0.6	NA	CNS
Cumulative Corresponding Hazard Index[c]							**3**		
Cumulative Corresponding Cancer Risk[d]								**7E-03**	

Total Developmental HI =	0.5
Total Neurological/CNS HI =	**1**
Total Gastrointestinal HI =	**1**

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.
[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.
[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen
[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent
Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,
Constituents selected as COPCs are indicated by shading.

µg/L = micrograms per liter
HI = Hazard Index
UCL = Upper Confidence Limit
RSL = Regional Screening Level
NA = Not available/not applicable

Table 2.3b
Step 3 Groundwater Screening - Risk Ratio, 95% UCL
Cheatham Annex, Williamsburg, Virginia
AOC 3 - Groundwater

Analyte	Detection Frequency	95% UCL	95% UCL Rationale	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations
in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).
Options: Maximum Detected Value (M); 99% Kaplan-Meier Chebyshev (99% KM); 95% Kaplan-Meier (t) UCL (95% KM-t); 95% Kaplan-Meier (percentile Bootstrap) (95% KM-b);
95% Kaplan-Meier (BCA) UCL (95% KM-BCA); 95% Kaplan-Meier Chebyshev (95% KM); 95% Chebyshev (mean, std) UCL (95% Cheb-m); Approximate Gamma UCL (G-App); 95% Student's-T test UCL (95% Stud-t);
99% Chebyshev (Mean, Sd) UCL (99% Cheb-m); 97.5% Kaplan-Meier Chebyshev UCL (97.5% KM)

UCL Rationale:
(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.
(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.
(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.
(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).
(5) Maximum detected concentration because sample set less than 5 samples.
(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.
(7) The maximum detected concentration was used as the UCL because there too few disticint values.

Table 2.4

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - AOC 3

Cheatham Annex, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Groundwater Vapor Intrusion Into Indoor Air	95-50-1	1,2-Dichlorobenzene	2.0E-01 J	2.0E-01 J	UG/L	CAA03-GW03-1109	1/5	1 - 1	2.0E-01	N/A	4.2E+02 N	6.0E+02	MCL	NO	BSL
	106-46-7	1,4-Dichlorobenzene	2.0E+00 J	2.0E+00 J	UG/L	CAA03-GW03-1109	1/5	1 - 1	2.0E+00	N/A	3.5E+00 C	7.5E+01	MCL	NO	BSL
	71-43-2	**Benzene**	**1.4E+01**	**1.4E+01**	**UG/L**	**CAA03-GW05-1109**	**1/5**	**1 - 1**	**1.4E+01**	**N/A**	**1.9E+00 C**	**5.0E+00**	MCL	**YES**	**ASL-VI GWSL**
	110-82-7	Cyclohexane	1.2E+01	1.2E+01	UG/L	CAA03-GW05-1109	1/5	1 - 1	1.2E+01	N/A	N/A	N/A	N/A	NO	NTX
	100-41-4	**Ethylbenzene**	**2.0E-01 J**	**1.0E+01**	**UG/L**	**CAA03-GW05-1109**	**2/5**	**1 - 1**	**1.0E+01**	**N/A**	**4.5E+00 C**	**7.0E+02**	MCL	**YES**	**ASL-VI GWSL**
	98-82-8	Isopropylbenzene	4.0E+00	4.0E+00	UG/L	CAA03-GW05-1109	1/5	1 - 1	4.0E+00	N/A	1.5E+02 N	N/A	N/A	NO	BSL
	m&pXYLENE	m- and p-Xylene	1.0E+00 J	2.0E+01	UG/L	CAA03-GW05-1109	2/5	2 - 2	2.0E+01	N/A	5.1E+02 N	N/A	N/A	NO	BSL
	108-87-2	Methylcyclohexane	1.1E+01	1.1E+01	UG/L	CAA03-GW05-1109	1/5	1 - 1	1.1E+01	N/A	N/A	N/A	N/A	NO	NTX
	1634-04-4	Methyl-tert-butyl ether (MTBE)	3.0E+00	3.0E+00	UG/L	CAA03-GW01-1109	1/5	2 - 2	3.0E+00	N/A	5.2E+02 C	N/A	N/A	NO	BSL
	95-47-6	o-Xylene	4.0E-01 J	5.0E+00	UG/L	CAA03-GW05-1109	2/5	1 - 1	5.0E+00	N/A	5.2E+02 N	N/A	N/A	NO	BSL
	100-42-5	Styrene	5.0E-01 J	5.0E-01 J	UG/L	CAA03-GW05-1109	1/5	1 - 1	5.0E-01	N/A	1.3E+03 N	1.0E+02	MCL	NO	BSL
	108-88-3	Toluene	2.0E+00	2.0E+00	UG/L	CAA03-GW05-1109	1/5	1 - 1	2.0E+00	N/A	2.7E+03 N	1.0E+03	MCL	NO	BSL
	1330-20-7	Xylene, total	2.0E+00 J	2.5E+01	UG/L	CAA03-GW05-1109	2/5	3 - 3	2.5E+01	N/A	7.0E+01 N	1.0E+04	MCL	NO	BSL
	92-52-4	1,1-Biphenyl	8.0E+00 J	8.0E+00 J	UG/L	CAA03-GW05-1109	1/5	9 - 12	8.0E+00	N/A	N/A	N/A	N/A	NO	NTX
	91-57-6	2-Methylnaphthalene	1.5E+00	3.2E+01	UG/L	CAA03-GW05-1109	3/5	0.2 - 29	3.2E+01	N/A	N/A	N/A	N/A	NO	NTX
	83-32-9	Acenaphthene	5.4E-01	8.9E+00 J	UG/L	CAA03-GW05-1109	3/5	0.19 - 23	8.9E+00	N/A	N/A	N/A	N/A	NO	NTX
	208-96-8	Acenaphthylene	2.6E-01 J	4.8E+00	UG/L	CAA03-GW05-1109	3/5	0.19 - 0.57	4.8E+00	N/A	N/A	N/A	N/A	NO	NTX
	120-12-7	Anthracene	2.6E-01	6.7E+00	UG/L	CAA03-GW05-1109	3/5	0.19 - 0.57	6.7E+00	N/A	N/A	N/A	N/A	NO	NTX
	100-52-7	Benzaldehyde	2.0E+00 J	2.0E+00 J	UG/L	CAA03-GW05-1109	1/5	9 - 12	2.0E+00	N/A	N/A	N/A	N/A	NO	NTX
	132-64-9	Dibenzofuran	3.0E+00 J	1.9E+01	UG/L	CAA03-GW05-1109	2/5	9 - 12	1.9E+01	N/A	N/A	N/A	N/A	NO	NTX
	86-73-7	Fluorene	9.8E-01	2.1E+01 J	UG/L	CAA03-GW05-1109	3/5	0.19 - 23	2.1E+01	N/A	N/A	N/A	N/A	NO	NTX
	91-20-3	**Naphthalene**	**1.1E+01**	**5.6E+02**	**UG/L**	**CAA03-GW05-1109**	**3/5**	**0.2 - 23**	**5.6E+02**	**N/A**	**6.7E+00 C**	**N/A**	N/A	**YES**	**ASL-VI GWSL**
	85-01-8	Phenanthrene	1.6E+00	3.6E+01	UG/L	CAA03-GW05-1109	3/5	0.19 - 23	3.6E+01	N/A	N/A	N/A	N/A	NO	NTX
	129-00-0	Pyrene	4.2E-01	6.3E+00	UG/L	CAA03-GW05-1109	3/5	0.19 - 0.57	6.3E+00	N/A	N/A	N/A	N/A	NO	NTX

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values from CAX groundwater background sample group (CC); values represent the 95% UTL.

[4] Vapor Intrusion Groundwater Screening Levels. See Table 2.4 Supplement A

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL-VI GWSL)
No Toxicity Information (NTX)

Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

COPC = Chemical of Potential Concern
J = Estimated Value
K = Biased High
L = Biased Low
C = Carcinogenic
N = Noncarcinogenic
UG/L = micrograms per liter
ND = not detected
N/A = not available, not applicable
MCL = Maximum Contaminant Level, Primary Drinking Water Standards

TABLE 2.4 Supplement A

Calculation of Target Groundwater Concentrations for Vapor Intrusion Screening[1]

Cheatham Annex Areas of Concern, Williamsburg, Virginia

AOC 3 - Indoor Air

CAS Number	Constituent	Target Indoor Air Concentration[2], carcinogen (C_{Cancer}) ug/m³	Target Indoor Air Concentration[2], non-carcinogen ($C_{non-Cancer}$) ug/m³	Target Indoor Air Concentration ($C_{target,ia}$) ug/m³	System Temperature Henry's Law Constant (H'TS)[3] Dimensionless	Risk-Based Target Groundwater Concentration (C_{gw}) ug/L
95-50-1	1,2-Dichlorobenzene	N/A	2.1E+01	2.1E+01	5.0E-02	4.2E+02
106-46-7	1,4-Dichlorobenzene	2.2E-01	8.3E+01	2.2E-01	6.3E-02	3.5E+00
71-43-2	Benzene	3.1E-01	3.1E+00	3.1E-01	1.7E-01	1.9E+00
110-82-7	Cyclohexane	N/A	6.3E+02	6.3E+02	N/A	N/A
100-41-4	Ethylbenzene	9.7E-01	1.0E+02	9.7E-01	2.2E-01	4.5E+00
98-82-8	Isopropylbenzene	N/A	4.2E+01	4.2E+01	2.9E-01	1.5E+02
m&pXYLENE	m- and p-Xylene	N/A	7.3E+01	7.3E+01	1.4E-01	5.1E+02
108-87-2	Methylcyclohexane	N/A	N/A	N/A	6.0E+02	N/A
1634-04-4	Methyl-tert-butyl ether (MTBE)	9.4E+00	3.1E+02	9.4E+00	1.8E-02	5.2E+02
95-47-6	o-Xylene	N/A	7.3E+01	7.3E+01	1.4E-01	5.2E+02
100-42-5	Styrene	N/A	1.0E+02	1.0E+02	7.5E-02	1.3E+03
108-88-3	Toluene	N/A	5.2E+02	5.2E+02	1.9E-01	2.7E+03
1330-20-7	Xylene, total	N/A	1.0E+01	1.0E+01	1.4E-01	7.0E+01
92-52-4	1,1-Biphenyl	N/A	N/A	N/A	7.2E-03	N/A
91-57-6	2-Methylnaphthalene	N/A	N/A	N/A	1.1E-02	N/A
83-32-9	Acenaphthene	N/A	N/A	N/A	3.9E-03	N/A
208-96-8	Acenaphthylene	N/A	N/A	N/A	N/A	N/A
120-12-7	Anthracene	N/A	N/A	N/A	N/A	N/A
100-52-7	Benzaldehyde	N/A	N/A	N/A	6.2E-04	N/A
132-64-9	Dibenzofuran	N/A	N/A	N/A	2.3E-04	N/A
86-73-7	Fluorene	N/A	N/A	N/A	2.1E-03	N/A
91-20-3	Naphthalene	7.2E-02	3.1E-01	7.2E-02	1.1E-02	6.7E+00
85-01-8	Phenanthrene	N/A	N/A	N/A	N/A	N/A
129-00-0	Pyrene	N/A	N/A	N/A	2.1E-04	N/A

Notes:

[1] The vapor intrusion screening levels [i.e., target groundwater concentration from Table 2c, Subsurface Vapor Intrusion Guidance (EPA, 2002)] were updated using the methodology presented in Appendix D of Subsurface Vapor Intrusion Guidance (EPA, 2002).

[2] Values are Regional Screening Levels (RSL) for residential air (based on 10^{-6} for carcinogens and HQ of 0.1 for noncarcinogens). [Oak Ridge National Laboratory (ORNL), May 2010]. RSL for p-Xylene used as a surrogate for m,p-Xylenes.

[3] H'TS = Henry's Law Constant (demensionless) at system (i.e., groundwater) temperature. Calculated using equation 3 from USEPA, 2004. Average groundwater temperature (17.8°C) based on data from October/November 2009 sampling event.

N/A = Not available

ug/L = microgram per liter

ug/m³ = microgram per cubic meter

Variables	Units	Value
$C_{target,ia}$ = Target indoor air conc., minimum	ug/m³	Solved by Eq. 1
C_{gw} = Target groundwater conc.	ug/L	Solved by Eq. 2
TCR = Target Cancer Risk	unitless	1.00E-06
THQ = Target Hazard Quotient	unitless	1
H'TS = Dimensionless Henry's Law Constant	unitless	Chemical-specific
alpha (α) = Attenuation Factor	unitless	0.001

Equation 1: $C_{target,ia}$ = Minimum(C_{cancer}, $C_{non-cancer}$)

Equation 2: Cgw = $C_{target,ia} \times 10^{-3}$ m³/L * 1/H'TS * 1/α

Table 2.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Surface Water	83-32-9	Acenaphthene	6.9E-02 J	6.9E-02 J	UG/L	CAA03-SW02-1209	1/8	0.19 - 0.2	6.9E-02	N/A	2.2E+03 N	N/A	N/A	NO	BSL
AOC3/Site 4	**50-32-8**	**Benzo(a)pyrene**	**7.3E-02 J**	**2.4E-01 J**	**UG/L**	**CAS04-SW04-1209**	**2/8**	**0.19 - 0.2**	**2.4E-01**	**N/A**	**2.9E-02 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
Upstream Pond	191-24-2	Benzo(g,h,i)perylene	1.6E-01 J	1.6E-01 J	UG/L	CAS04-SW04-1209	1/8	0.19 - 0.2	1.6E-01	N/A	1.1E+03 N	N/A	N/A	NO	BSL
	207-08-9	Benzo(k)fluoranthene	1.5E-01 J	1.5E-01 J	UG/L	CAS04-SW04-1209	1/8	0.19 - 0.2	1.5E-01	N/A	2.9E+00 C	N/A	N/A	NO	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	7.5E-01 J	1.3E+00	UG/L	CAS04-SW03-1209	5/8	0.94 - 0.98	1.3E+00	N/A	4.8E+01 C	N/A	N/A	NO	BSL
	218-01-9	Chrysene	8.0E-02 J	8.0E-02 J	UG/L	CAS04-SW04-1209	1/8	0.19 - 0.2	8.0E-02	N/A	2.9E+01 C	N/A	N/A	NO	BSL
	206-44-0	Fluoranthene	1.3E-01 J	3.2E-01	UG/L	CAS04-SW04-1209	2/8	0.19 - 0.2	3.2E-01	N/A	1.5E+03 N	N/A	N/A	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	2.4E-01	2.4E-01	UG/L	CAS04-SW04-1209	1/8	0.19 - 0.2	2.4E-01	N/A	2.9E-01 C	N/A	N/A	NO	BSL
	91-20-3	Naphthalene	6.6E-02 J	6.6E-02 J	UG/L	CAA03-SW02-1209	1/8	0.19 - 0.2	6.6E-02	N/A	1.4E+00 C*	N/A	N/A	NO	BSL
	85-01-8	Phenanthrene	6.8E-02 J	7.4E-02 J	UG/L	CAS04-SW04-1209	2/8	0.19 - 0.2	7.4E-02	N/A	1.1E+04 N	N/A	N/A	NO	BSL
	129-00-0	Pyrene	1.0E-01 J	2.9E-01	UG/L	CAS04-SW04-1209	2/8	0.19 - 0.2	2.9E-01	N/A	1.1E+03 N	N/A	N/A	NO	BSL
	7429-90-5	Aluminum	1.8E+02 J	2.7E+03	UG/L	CAS04-SW03-1209	5/8	300 - 300	2.7E+03	N/A	3.7E+04 N	N/A	N/A	NO	BSL
	7440-38-2	**Arsenic**	**1.0E+01**	**1.0E+01**	**UG/L**	**CAS04-SW03-1209**	**1/8**	**5 - 5**	**1.0E+01**	**N/A**	**4.5E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-39-3	Barium	2.3E+01	4.4E+01	UG/L	CAS04-SW03-1209	8/8	1 - 1	4.4E+01	N/A	7.3E+03 N	N/A	N/A	NO	BSL
	7440-41-7	Beryllium	6.0E-02 J	1.2E-01 J	UG/L	CAS04-SW03-1209	2/8	1 - 1	1.2E-01	N/A	7.3E+01 N	N/A	N/A	NO	BSL
	7440-43-9	Cadmium	1.1E-01 J	8.2E-01 J	UG/L	CAS04-SW03-1209	7/8	1 - 1	8.2E-01	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	7440-70-2	Calcium	6.4E+04	1.1E+05	UG/L	CAS04-SW03-1209	8/8	50 - 50	1.1E+05	N/A	N/A	N/A	N/A	NO	NUT
	7440-48-4	Cobalt	2.8E-01 J	1.5E+00	UG/L	CAS04-SW03-1209	8/8	1 - 1	1.5E+00	N/A	1.1E+01 N	N/A	N/A	NO	BSL
	7440-50-8	Copper	3.0E+00	2.6E+01	UG/L	CAS04-SW03-1209	8/8	1 - 1	2.6E+01	N/A	1.5E+03 N	N/A	N/A	NO	BSL
	7439-89-6	Iron	1.1E+03	1.9E+04	UG/L	CAS04-SW03-1209	8/8	100 - 100	1.9E+04	N/A	2.6E+04 N	N/A	N/A	NO	BSL
	7439-92-1	Lead	5.6E-01 J	5.9E+00	UG/L	CAS04-SW03-1209	6/8	1 - 1	5.9E+00	N/A	1.5E+01 AL	N/A	N/A	NO	BSL
	7439-95-4	Magnesium	1.8E+03	3.0E+03	UG/L	CAS04-SW03-1209	8/8	50 - 50	3.0E+03	N/A	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	4.3E+01	1.4E+02	UG/L	CAS04-SW03-1209	8/8	5 - 5	1.4E+02	N/A	8.8E+02 N	N/A	N/A	NO	BSL
	7440-02-0	Nickel	3.5E+00 J	3.5E+00 J	UG/L	CAS04-SW03-1209	1/8	40 - 40	3.5E+00	N/A	7.3E+02 N	N/A	N/A	NO	BSL
	7440-09-7	Potassium	1.5E+03	1.9E+03	UG/L	CAS04-SW03-1209	8/8	1000 - 1000	1.9E+03	N/A	N/A	N/A	N/A	NO	NUT
	7782-49-2	Selenium	8.6E-01 J	8.6E-01 J	UG/L	CAS04-SW04-1209	1/8	5 - 5	8.6E-01	N/A	1.8E+02 N	N/A	N/A	NO	BSL
	7440-22-4	Silver	5.0E-02 J	7.0E-02 J	UG/L	CAA03-SW04-1209	4/8	1 - 1	7.0E-02	N/A	1.8E+02 N	N/A	N/A	NO	BSL
	7440-23-5	Sodium	4.3E+03	6.0E+03	UG/L	CAS04-SW03-1209	8/8	1000 - 1000	6.0E+03	N/A	N/A	N/A	N/A	NO	NUT
	7440-62-2	Vanadium	8.3E+00	8.3E+00	UG/L	CAS04-SW03-1209	1/8	5 - 5	8.3E+00	N/A	1.8E+02 N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	9.3E+00 J	6.5E+01	UG/L	CAS04-SW03-1209	8/8	25 - 25	6.5E+01	N/A	1.1E+04 N	N/A	N/A	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Tap Water RSLs adjusted by 10 for carcinogens (based on 10^{-7} for carcinogens and HQ of 1.0 for noncarcinogens).

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

J = Estimated Value

C = Carcinogenic

Table 2.5

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

Available: http://epa-prgs.ornl.gov/chemicals/index.shtml
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
The Federal Action Level for Lead is used as its SL.
RSL value for Manganese (water) used as surrogate for manganese.

[5] Rationale Codes

Selection Reason: Above Tap Water Screening Levels (ASL-RSL)
No Toxicity Information (NTX), not quantified

Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

C* = where: N SL < 100X C SL
N = Noncarcinogenic
N/A = Not available or Not applicable
RSL = Regional Screening Levels
AL = Action Level

TABLE 2.5a

Step 2 Surface Water Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

AOC 3/Site 4 - Surface Water, Upstream Pond

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (ug/L)								
Benzo(a)pyrene	2 / 8	2.4E-01 J	CAS04-SW04-1209	2.9E-03	1E-06	NA	8E-05	NA
Metals (ug/L)								
Arsenic	1 / 8	1.0E+01	CAS04-SW03-1209	4.5E-02	1E-06	NA	2E-04	NA
Cumulative Corresponding Hazard Index[c]						**NA**		
Cumulative Corresponding Cancer Risk[d]							**3E-04**	

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

µg/L = micrograms per liter

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.5b

Step 3 Surface Water Screening - Risk Ratio, 95% UCL

Cheatham Annex Areas of Concern, Williamsburg, Virginia

AOC 3/Site 4 - Surface Water, Upstream Pond

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (ug/L)									
Benzo(a)pyrene	2 / 8	1.5E-01	95% KM-t	4	2.9E-03	1E-06	NA	5E-05	NA
Metals (ug/L)									
Arsenic	1 / 8	1.0E+01	Max	7	4.5E-02	1E-06	NA	2E-04	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**3E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

µg/L = micrograms per liter

HI = Hazard Index

NA = Not available/not applicable

RSL = Regional Screening Levels

UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations

in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max); 95% Kaplan-Meier (t) UCL (95% KM-t).

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

(7) The maximum detected concentration was used as the UCL because there too few distinct values.

Table 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Sediment (0-4")
Exposure Medium: Surface Sediment (0-4")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Sediment (0 - 4")	78-93-3	2-Butanone	1.2E-02 J	5.6E-02 J	MG/KG	CAA03-SD04-1209A	4/12	0.01581 - 0.11	5.6E-02	N/A	2.8E+04 N	N/A	N/A	NO	BSL
AOC3/Site 4	67-64-1	Acetone	7.4E-02 J	2.7E-01 J	MG/KG	CAA03-SD02-1209A	6/12	0.01581 - 0.11	2.7E-01	N/A	6.1E+04 N	N/A	N/A	NO	BSL
Upstream Pond	75-15-0	Carbon disulfide	2.0E-03 J	3.0E-03 J	MG/KG	CAA03-SD04-1209A	2/12	0.005 - 0.021	3.0E-03	N/A	7.4E+02 NS	N/A	N/A	NO	BSL
	100-41-4	Ethylbenzene	2.0E-03 J	3.0E-03 J	MG/KG	CAS004-4-SD04-00-1199	2/12	0.005 - 0.021	3.0E-03	N/A	5.4E+01 C	N/A	N/A	NO	BSL
	79-20-9	Methyl acetate	5.0E-03 J	5.0E-03 J	MG/KG	CAA03-SD04-1209A	1/7	0.009 - 0.038	5.0E-03	N/A	2.9E+04 NS	N/A	N/A	NO	BSL
	108-87-2	Methylcyclohexane	4.0E-03 J	4.0E-03 J	MG/KG	CAA03-SD02-1209A	1/8	0.005 - 0.021	4.0E-03	N/A	N/A	N/A	N/A	NO	NTX
	127-18-4	Tetrachloroethene	5.0E-03 J	5.0E-02 J	MG/KG	CAA03-SD01-1209A	8/12	0.005 - 0.021	5.0E-02	N/A	5.5E+00 C	N/A	N/A	NO	BSL
	108-88-3	Toluene	3.0E-03 L	3.0E-03 L	MG/KG	CAS004-4-SD02-00-1199	1/12	0.005 - 0.021	3.0E-03	N/A	8.2E+02 NS	N/A	N/A	NO	BSL
	1330-20-7	Xylene, total	1.0E-02 J	1.0E-02 J	MG/KG	CAS004-4-SD04-00-1199	1/12	0.01581 - 0.064	1.0E-02	N/A	2.6E+02 NS	N/A	N/A	NO	BSL
	91-57-6	2-Methylnaphthalene	4.0E-03 L	1.9E-02 J	MG/KG	CAA03-SD02-1209A	3/12	0.024 - 0.55	1.9E-02	N/A	3.1E+02 N	N/A	N/A	NO	BSL
	83-32-9	Acenaphthene	2.9E-03 J	3.0E-01	MG/KG	CAA03-SD02-1209A	6/12	0.024 - 0.55	3.0E-01	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	208-96-8	Acenaphthylene	1.8E-03 J	1.2E-01	MG/KG	CAS04-SD03-1209A	7/12	0.024 - 0.55	1.2E-01	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	120-12-7	Anthracene	2.8E-03 J	2.6E-01	MG/KG	CAS04-SD03-1209A	8/12	0.024 - 0.55	2.6E-01	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	56-55-3	Benzo(a)anthracene	1.1E-01	1.5E+00	MG/KG	CAS04-SD04-1209A	8/12	0.024 - 1.2	1.5E+00	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	50-32-8	**Benzo(a)pyrene**	**3.1E-02 J**	**2.1E+00**	**MG/KG**	**CAS04-SD03-1209A**	**10/12**	**0.024 - 1.6**	**2.1E+00**	**N/A**	**1.5E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	205-99-2	**Benzo(b)fluoranthene**	**6.2E-02 J**	**3.9E+00**	**MG/KG**	**CAS04-SD03-1209A**	**10/12**	**0.024 - 1.6**	**3.9E+00**	**N/A**	**1.5E+00 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	191-24-2	Benzo(g,h,i)perylene	5.6E-02 J	1.9E+00 L	MG/KG	CAS04-SD03-1209A	8/12	0.024 - 1.6	1.9E+00	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	207-08-9	Benzo(k)fluoranthene	2.4E-02 J	1.6E+00	MG/KG	CAS04-SD03-1209A	9/12	0.024 - 1.6	1.6E+00	N/A	1.5E+01 C	N/A	N/A	NO	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	1.1E-01 J	2.8E-01 J	MG/KG	CAS004-4-SD04-00D-1199	5/12	0.12 - 1.6	2.8E-01	N/A	3.5E+02 C*	N/A	N/A	NO	BSL
	86-74-8	Carbazole	1.9E-02 J	4.9E-02 K	MG/KG	CAS04-SD04-1209A	4/12	0.024 - 0.55	4.9E-02	N/A	N/A	N/A	N/A	NO	NTX
	218-01-9	Chrysene	1.8E-02 J	2.7E+00	MG/KG	CAS04-SD03-1209A	12/12	0.024 - 1.6	2.7E+00	N/A	1.5E+02 C	N/A	N/A	NO	BSL
	53-70-3	**Dibenz(a,h)anthracene**	**1.1E-01 J**	**6.6E-01**	**MG/KG**	**CAS04-SD03-1209A**	**3/12**	**0.024 - 0.59**	**6.6E-01**	**N/A**	**1.5E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	84-74-2	Di-n-butylphthalate	6.4E-02 J	8.1E-02 J	MG/KG	CAS004-4-SD03-00-1199	3/12	0.054 - 0.42	8.1E-02	N/A	6.1E+03 N	N/A	N/A	NO	BSL
	206-44-0	Fluoranthene	3.7E-02	1.8E+00	MG/KG	CAS04-SD04-1209A	12/12	0.024 - 1.2	1.8E+00	N/A	2.3E+03 N	N/A	N/A	NO	BSL
	86-73-7	Fluorene	4.2E-01	4.2E-01	MG/KG	CAA03-SD02-1209A	1/12	0.024 - 0.55	4.2E-01	N/A	2.3E+03 N	N/A	N/A	NO	BSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	**8.1E-02**	**2.8E+00**	**MG/KG**	**CAS04-SD03-1209A**	**7/12**	**0.024 - 1.6**	**2.8E+00**	**N/A**	**1.5E+00 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	91-20-3	Naphthalene	5.7E-03 J	2.8E-01	MG/KG	CAA03-SD02-1209A	3/12	0.024 - 0.55	2.8E-01	N/A	3.6E+01 C*	N/A	N/A	NO	BSL
	87-86-5	Pentachlorophenol	2.4E-02 L	1.1E-01 J	MG/KG	CAA03-SD02-1209A	2/12	0.12 - 1.4	1.1E-01	N/A	3.0E+01 C	N/A	N/A	NO	BSL
	85-01-8	Phenanthrene	1.9E-02 J	4.2E-01	MG/KG	CAA03-SD02-1209A	12/12	0.024 - 1.2	4.2E-01	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	129-00-0	Pyrene	3.6E-02	3.8E+00	MG/KG	CAS04-SD04-1209A	12/12	0.024 - 1.2	3.8E+00	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	72-54-8	4,4'-DDD	6.6E-03 J	3.8E-01 J	MG/KG	CAS04-SD03-1209A	5/12	0.0041 - 0.043	3.8E-01	N/A	2.0E+01 C	N/A	N/A	NO	BSL
	72-55-9	4,4'-DDE	9.2E-04 J	6.0E-01 J	MG/KG	CAS04-SD03-1209A	7/12	0.0041 - 0.1	6.0E-01	N/A	1.4E+01 C	N/A	N/A	NO	BSL
	50-29-3	4,4'-DDT	2.1E-03 J	1.6E+00 J	MG/KG	CAS04-SD03-1209A	6/12	0.0041 - 0.1	1.6E+00	N/A	1.7E+01 C*	N/A	N/A	NO	BSL
	309-00-2	Aldrin	8.5E-04 J	8.5E-04 J	MG/KG	CAA03-SD04-1209A	1/12	0.0021 - 0.0071	8.5E-04	N/A	2.9E-01 C*	N/A	N/A	NO	BSL
	5103-71-9	alpha-Chlordane	1.7E-03 J	1.7E-02 J	MG/KG	CAS04-SD03-1209A	2/12	0.0021 - 0.0071	1.7E-02	N/A	1.6E+01 C*	N/A	N/A	NO	BSL
	12672-29-6	Aroclor-1248	1.9E-02 L	1.9E-02 L	MG/KG	CAS004-4-SD04-00-1199	1/12	0.024 - 0.3	1.9E-02	N/A	2.2E+00 C	N/A	N/A	NO	BSL

Table 2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4
Cheatham Annex Areas of Concern, Williamsburg, Virginia
Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Surface Sediment (0-4")
Exposure Medium: Surface Sediment (0-4")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	11097-69-1	**Aroclor-1254**	**2.1E+01**	**2.1E+01**	**MG/KG**	**CAS04-SD03-1209A**	**1/12**	**0.021 - 0.27**	**2.1E+01**	**N/A**	**1.1E+00 C****	**N/A**	**N/A**	**YES**	**ASL-RSL**
	11096-82-5	Aroclor-1260	3.0E-02 J	1.2E+00 L	MG/KG	CAA03-SD02-1209A	10/12	0.022 - 0.28	1.2E+00	N/A	2.2E+00 C	N/A	N/A	NO	BSL
	60-57-1	**Dieldrin**	**1.7E-03 J**	**1.4E+00 J**	**MG/KG**	**CAS04-SD03-1209A**	**4/12**	**0.0041 - 0.1**	**1.4E+00**	**N/A**	**3.0E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	959-98-8	Endosulfan I	1.6E-03 J	5.8E-02 L	MG/KG	CAS04-SD03-1209A	3/12	0.0021 - 0.0071	5.8E-02	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	33213-65-9	Endosulfan II	1.3E-03 J	8.3E-01 J	MG/KG	CAS04-SD03-1209A	3/12	0.0041 - 0.1	8.3E-01	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	1031-07-8	Endosulfan sulfate	1.4E-02 J	3.5E-02 J	MG/KG	CAA03-SD03-1209A	2/12	0.0041 - 0.014	3.5E-02	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	72-20-8	Endrin	9.6E-03	1.2E+00	MG/KG	CAS04-SD03-1209A	3/12	0.0041 - 0.1	1.2E+00	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	7421-93-4	Endrin aldehyde	3.3E-03 J	2.9E-01 J	MG/KG	CAS04-SD03-1209A	3/12	0.0041 - 0.1	2.9E-01	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	5103-74-2	gamma-Chlordane	1.1E-03 L	7.8E-01 J	MG/KG	CAS04-SD03-1209A	6/12	0.0021 - 0.053	7.8E-01	N/A	1.6E+01 C*	N/A	N/A	NO	BSL
	76-44-8	Heptachlor	6.9E-04 J	6.9E-04 J	MG/KG	CAA03-SD04-1209A	1/12	0.0021 - 0.0071	6.9E-04	N/A	1.1E+00 C	N/A	N/A	NO	BSL
	1024-57-3	**Heptachlor epoxide**	**5.4E-01 J**	**5.4E-01 J**	**MG/KG**	**CAS04-SD03-1209A**	**1/12**	**0.0021 - 0.053**	**5.4E-01**	**N/A**	**5.3E-01 C***	**N/A**	**N/A**	**YES**	**ASL-RSL**
	72-43-5	Methoxychlor	5.2E-01 J	5.2E-01 J	MG/KG	CAS04-SD03-1209A	1/12	0.021 - 0.53	5.2E-01	N/A	3.1E+02 N	N/A	N/A	NO	BSL
	7429-90-5	Aluminum	4.2E+03 L	2.0E+04	MG/KG	CAS04-SD03-1209A	12/12	27 - 82	2.0E+04	N/A	7.7E+04 N	N/A	N/A	NO	BSL
	7440-36-0	Antimony	5.0E-01 L	2.2E+00 L	MG/KG	CAA03-SD02-1209A	3/12	0.72 - 22.7	2.2E+00	N/A	3.1E+01 N	N/A	N/A	NO	BSL
	7440-38-2	**Arsenic**	**3.2E+00**	**4.4E+01 L**	**MG/KG**	**CAA03-SD02-1209A**	**12/12**	**0.72 - 3.8**	**4.4E+01**	**N/A**	**3.9E+00 C***	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-39-3	Barium	1.2E+01	1.7E+02	MG/KG	CAS04-SD04-1209A	12/12	0.45 - 75.7	1.7E+02	N/A	1.5E+04 N	N/A	N/A	NO	BSL
	7440-41-7	Beryllium	2.5E-01 J	9.8E-01	MG/KG	CAA03-SD01-1209A	11/12	0.45 - 1.9	9.8E-01	N/A	1.6E+02 N	N/A	N/A	NO	BSL
	7440-43-9	Cadmium	1.1E-01	5.7E+00	MG/KG	CAS004-4-SED01-00-1199	12/12	0.09 - 1.5	5.7E+00	N/A	7.0E+01 N	N/A	N/A	NO	BSL
	7440-70-2	Calcium	7.0E+02	2.5E+04	MG/KG	CAS004-4-SED01-00-1199	12/12	5.6 - 1893.5	2.5E+04	N/A	N/A	N/A	N/A	NO	NUT
	7440-47-3	**Chromium**	**8.9E+00 K**	**5.0E+01 K**	**MG/KG**	**CAS04-SD03-1209A**	**12/12**	**1.3 - 4.1**	**5.0E+01**	**N/A**	**2.9E+00 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-48-4	Cobalt	9.7E-01 J	5.1E+00 J	MG/KG	CAS04-SD03-1209A	11/12	2.7 - 18.9	5.1E+00	N/A	2.3E+01 N	N/A	N/A	NO	BSL
	7440-50-8	Copper	3.3E+00	1.4E+02	MG/KG	CAS04-SD03-1209A	12/12	0.3 - 9.5	1.4E+02	N/A	3.1E+03 N	N/A	N/A	NO	BSL
	7439-89-6	Iron	6.9E+03 J	2.6E+04 J	MG/KG	CAS04-SD03-1209A	12/12	9 - 37.9	2.6E+04	N/A	5.5E+04 N	N/A	N/A	NO	BSL
	7439-92-1	Lead	9.2E+00	4.2E+02	MG/KG	CAS04-SD03-1209A	12/12	0.45 - 1.4	4.2E+02	N/A	4.0E+03 NL	N/A	N/A	NO	BSL
	7439-95-4	Magnesium	5.0E+02 K	2.8E+03	MG/KG	CAS004-4-SED01-00-1199	12/12	4.5 - 1893.5	2.8E+03	N/A	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	1.5E+01 J	1.4E+02 J	MG/KG	CAS04-SD03-1209A	12/12	0.45 - 5.7	1.4E+02	N/A	1.8E+03 N	N/A	N/A	NO	BSL
	7439-97-6	Mercury	1.0E-02 J	6.2E-01	MG/KG	CAS04-SD03-1209A	10/12	0.038 - 0.2	6.2E-01	N/A	2.3E+01 N	N/A	N/A	NO	BSL
	7440-02-0	Nickel	2.2E+00 J	2.4E+01	MG/KG	CAS004-4-SED01-00-1199	12/12	3.6 - 15.1	2.4E+01	N/A	1.5E+03 N	N/A	N/A	NO	BSL
	7440-09-7	Potassium	5.0E+02 K	2.2E+03 K	MG/KG	CAA03-SD01-1209A	11/12	90 - 1893.5	2.2E+03	N/A	N/A	N/A	N/A	NO	NUT
	7782-49-2	Selenium	1.4E+00 J	1.4E+00 J	MG/KG	CAA03-SD02-1209A	1/12	0.9 - 2.7	1.4E+00	N/A	3.9E+02 N	N/A	N/A	NO	BSL
	7440-22-4	Silver	1.4E-01 J	6.1E+00	MG/KG	CAS04-SD03-1209A	7/12	1.3 - 4.1	6.1E+00	N/A	3.9E+02 N	N/A	N/A	NO	BSL
	7440-23-5	Sodium	2.4E+02 J	2.4E+02 J	MG/KG	CAA03-SD02-1209A	1/12	90 - 1893.5	2.4E+02	N/A	N/A	N/A	N/A	NO	NUT
	7440-28-0	Thallium	1.5E-01 J	5.3E-01 J	MG/KG	CAA03-SD01-1209A	2/12	1.3 - 4.1	5.3E-01	N/A	N/A	N/A	N/A	NO	NTX
	7440-62-2	Vanadium	1.2E+01 K	5.4E+01 K	MG/KG	CAA03-SD01-1209A	12/12	2.2 - 18.9	5.4E+01	N/A	3.9E+02 N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	1.2E+01 K	4.8E+02 K	MG/KG	CAS04-SD03-1209A	12/12	2.2 - 7.6	4.8E+02	N/A	2.3E+04 N	N/A	N/A	NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs adjusted by 10 for carcinogens (based on 10^7 for carcinogens and HQ of 1.0 for noncarcinogens).
Available: http://epa-prgs.ornl.gov/chemicals/index.shtml

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/
To Be Considered
J = Estimated Value
K = Biased High
L = Biased Low

Scenario Timeframe: Current/Future
Medium: Surface Sediment (0-4")
Exposure Medium: Surface Sediment (0-4")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

RSL value for Acenaphthene used as surrogate for Acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for Chromium(VI) used as surrogate for chromium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.
RSL value for Manganese (water) used as surrogate for manganese.
RSL value for Mercury (inorganic salts) used as surrogate for mercury.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde.

[5] Rationale Codes

Selection Reason: Above Regional Screening Level (ASL-RSL)
No Toxicity Information (NTX), not quantified

Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

C = Carcinogenic
C* = where: N SL < 100X C SL
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available or Not applicable
NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.
S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level

TABLE 2.6a

Step 2 Sediment Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

AOC 3/Site 4 - Sediment (0 - 4 inch), Upstream Pond

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)pyrene	10 / 12	2.1E+00	CAS04-SD03-1209A	1.5E-02	1E-06	NA	1E-04	NA
Benzo(b)fluoranthene	10 / 12	3.9E+00	CAS04-SD03-1209A	1.5E-01	1E-06	NA	3E-05	NA
Dibenz(a,h)anthracene	3 / 12	6.6E-01	CAS04-SD03-1209A	1.5E-02	1E-06	NA	4E-05	NA
Indeno(1,2,3-cd)pyrene	7 / 12	2.8E+00	CAS04-SD03-1209A	1.5E-01	1E-06	NA	2E-05	NA
Pesticides/PCBs (mg/kg)								
Aroclor-1254	1 / 12	2.1E+01	CAS04-SD03-1209A	1.1E-01	1E-06	NA	2E-04	NA
Dieldrin	4 / 12	1.4E+00 J	CAS04-SD03-1209A	3.0E-02	1E-06	NA	5E-05	NA
Heptachlor epoxide	1 / 12	5.4E-01 J	CAS04-SD03-1209A	5.3E-02	1E-06	NA	1E-05	NA
Metals (mg/kg)								
Arsenic	12 / 12	4.4E+01 L	CAA03-SD02-1209A	3.9E-01	1E-06	NA	1E-04	NA
Chromium	12 / 12	5.0E+01 K	CAS04-SD03-1209A	2.9E-01	1E-06	NA	2E-04	NA
Cumulative Corresponding Hazard Index[c]						**NA**		
Cumulative Corresponding Cancer Risk[d]							**8E-04**	

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,
otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

K = Biased High

L = Biased Low

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.6b

Step 3 Sediment Screening - Risk Ratio, 95% UCL

Cheatham Annex Areas of Concern, Williamsburg, Virginia

AOC 3/Site 4 - Sediment (0 - 4 inch), Upstream Pond

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)									
Benzo(a)pyrene	10 / 12	1.3E+00	95% KM	1, 3	1.5E-02	1E-06	NA	8E-05	NA
Benzo(b)fluoranthene	10 / 12	3.2E+00	97.5% KM	1	1.5E-01	1E-06	NA	2E-05	NA
Dibenz(a,h)anthracene	3 / 12	3.1E-01	95% KM-t	1, 2	1.5E-02	1E-06	NA	2E-05	NA
Indeno(1,2,3-cd)pyrene	7 / 12	2.024	97.5% KM	1	1.5E-01	1E-06	NA	1E-05	NA
Pesticides (mg/kg)									
Aroclor-1254	1 / 12	2.1E+01	Max	7	1.1E-01	1E-06	NA	2E-04	NA
Dieldrin	4 / 12	0.3528	95% KM-t	1, 2	3.0E-02	1E-06	NA	1E-05	NA
Heptachlor epoxide	1 / 12	5.4E-01	Max	7	5.3E-02	1E-06	NA	1E-05	NA
Metals (mg/kg)									
Arsenic	12 / 12	1.7E+01	G-App	1, 3	3.9E-01	1E-06	NA	4E-05	NA
Chromium	12 / 12	3.1E+01	G-App	1, 3	2.9E-01	1E-06	NA	1E-04	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**5E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram

HI = Hazard Index

NA = Not available/not applicable

RSL = Regional Screening Levels

UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations

in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max); 95% Kaplan-Meier Chebyshev (95% KM); Approximate Gamma UCL (G-App); 95% Student's-T test UCL (95% Stud-t);

97.5% Kaplan-Meier Chebyshev UCL (97.5% KM); 95% Kaplan-Meier (t) UCL (95% KM-t)

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

(7) The maximum detected concentration was used as the UCL because there too few distinct values.

Table 2.7

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Subsurface Sediment (4-8")
Exposure Medium: Subsurface Sediment (4-8")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Sediment (4-8")	95-50-1	1,2-Dichlorobenzene	2.0E-03 J	2.0E-03 J	MG/KG	CAS04-SD04-1209B	1/12	0.006 - 0.49	2.0E-03	N/A	3.8E+02 NS	N/A	N/A	NO	BSL
AOC3/Site 4	106-46-7	1,4-Dichlorobenzene	6.0E-03 J	6.0E-03 J	MG/KG	CAS04-SD04-1209B	1/12	0.006 - 0.49	6.0E-03	N/A	2.4E+01 C	N/A	N/A	NO	BSL
Upstream Pond	78-93-3	2-Butanone	9.0E-03 J	1.1E-01 J	MG/KG	CAA03-SD02-1209B	3/12	0.01389 - 0.037	1.1E-01	N/A	2.8E+04 N	N/A	N/A	NO	BSL
	108-10-1	4-Methyl-2-pentanone	2.0E-03 J	2.0E-03 J	MG/KG	CAS004-4-SD03-01-1199	1/12	0.01389 - 0.037	2.0E-03	N/A	3.4E+03 NS	N/A	N/A	NO	BSL
	67-64-1	Acetone	8.8E-02 J	4.2E-01 J	MG/KG	CAA03-SD02-1209B	3/12	0.01389 - 0.037	4.2E-01	N/A	6.1E+04 N	N/A	N/A	NO	BSL
	79-20-9	Methyl acetate	4.0E-03 J	4.0E-03 J	MG/KG	CAA03-SD04-1209B	1/8	0.011 - 0.013	4.0E-03	N/A	2.9E+04 NS	N/A	N/A	NO	BSL
	108-87-2	Methylcyclohexane	2.0E-03 J	2.0E-03 J	MG/KG	CAA03-SD02-1209B	1/8	0.006 - 0.007	2.0E-03	N/A	N/A	N/A	N/A	NO	NTX
	127-18-4	Tetrachloroethene	8.0E-03 J	4.2E-02	MG/KG	CAA03-SD01-1209B	8/12	0.006 - 0.01598	4.2E-02	N/A	5.5E+00 C	N/A	N/A	NO	BSL
	83-32-9	Acenaphthene	2.6E-03 J	9.0E-02	MG/KG	CAA03-SD02-1209B	2/12	0.023 - 0.49	9.0E-02	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	208-96-8	Acenaphthylene	8.9E-03 J	1.5E-02 J	MG/KG	CAS04-SD03-1209B	2/12	0.023 - 0.49	1.5E-02	N/A	3.4E+03 N	N/A	N/A	NO	BSL
	120-12-7	Anthracene	2.2E-03 J	3.3E-02	MG/KG	CAA03-SD02-1209B	6/12	0.023 - 0.49	3.3E-02	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	56-55-3	Benzo(a)anthracene	1.1E-01 J	2.3E-01 J	MG/KG	CAS004-4-SD02-01-1199	6/12	0.023 - 0.66	2.3E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	50-32-8	**Benzo(a)pyrene**	**2.8E-02**	**2.4E-01 J**	**MG/KG**	**CAS004-4-SD02-01-1199**	**7/12**	**0.023 - 0.031**	**2.4E-01**	**N/A**	**1.5E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	205-99-2	Benzo(b)fluoranthene	5.7E-02 J	5.1E-01	MG/KG	CAS04-SD03-1209B	6/12	0.023 - 0.099	5.1E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	191-24-2	Benzo(g,h,i)perylene	2.9E-02 J	1.0E-01 J	MG/KG	CAS004-4-SD02-01-1199	4/12	0.023 - 0.031	1.0E-01	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	207-08-9	Benzo(k)fluoranthene	5.2E-02	2.8E-01 J	MG/KG	CAS004-4-SD02-01-1199	5/12	0.023 - 0.031	2.8E-01	N/A	1.5E+01 C	N/A	N/A	NO	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	5.9E-02 J	1.2E-01 J	MG/KG	CAS004-4-SED01-01-1199	6/12	0.077 - 0.15	1.2E-01	N/A	3.5E+02 C*	N/A	N/A	NO	BSL
	85-68-7	Butylbenzylphthalate	1.4E-01 J	1.4E-01 J	MG/KG	CAS04-SD03-1209B	1/12	0.38 - 0.51	1.4E-01	N/A	2.6E+03 C*	N/A	N/A	NO	BSL
	218-01-9	Chrysene	3.3E-03 J	3.3E-01 J	MG/KG	CAS004-4-SD02-01-1199	11/12	0.023 - 0.031	3.3E-01	N/A	1.5E+02 C	N/A	N/A	NO	BSL
	53-70-3	Dibenz(a,h)anthracene	4.5E-02 J	8.4E-02	MG/KG	CAS04-SD03-1209B	2/12	0.023 - 0.49	8.4E-02	N/A	1.5E-01 C	N/A	N/A	NO	BSL
	84-74-2	Di-n-butylphthalate	6.1E-02 J	1.1E-01 J	MG/KG	CAS04-SD03-1209B	4/12	0.047 - 0.15	1.1E-01	N/A	6.1E+03 N	N/A	N/A	NO	BSL
	206-44-0	Fluoranthene	4.7E-03 J	5.2E-01	MG/KG	CAS004-4-SD02-01-1199	12/12	0.023 - 0.031	5.2E-01	N/A	2.3E+03 N	N/A	N/A	NO	BSL
	86-73-7	Fluorene	1.8E-01	1.8E-01	MG/KG	CAA03-SD02-1209B	1/12	0.023 - 0.49	1.8E-01	N/A	2.3E+03 N	N/A	N/A	NO	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	6.4E-02 J	3.7E-01	MG/KG	CAS04-SD03-1209B	5/12	0.023 - 0.099	3.7E-01	N/A	1.5E+00 C	N/A	N/A	NO	BSL
	91-20-3	Naphthalene	5.3E-02	5.3E-02	MG/KG	CAA03-SD02-1209B	1/12	0.023 - 0.49	5.3E-02	N/A	3.6E+01 C*	N/A	N/A	NO	BSL
	85-01-8	Phenanthrene	2.4E-03 J	2.4E-01 J	MG/KG	CAS004-4-SD02-01-1199	11/12	0.023 - 0.031	2.4E-01	N/A	1.7E+04 N	N/A	N/A	NO	BSL
	129-00-0	Pyrene	4.6E-03 J	4.7E-01	MG/KG	CAS004-4-SD02-01-1199	12/12	0.023 - 0.66	4.7E-01	N/A	1.7E+03 N	N/A	N/A	NO	BSL
	72-54-8	4,4'-DDD	2.1E-02 J	2.6E-01 J	MG/KG	CAS04-SD03-1209B	3/12	0.004 - 0.0049	2.6E-01	N/A	2.0E+01 C	N/A	N/A	NO	BSL
	72-55-9	4,4'-DDE	4.4E-03 J	2.7E-01 J	MG/KG	CAS04-SD03-1209B	4/12	0.004 - 0.086	2.7E-01	N/A	1.4E+01 C	N/A	N/A	NO	BSL
	50-29-3	4,4'-DDT	1.9E-02 J	7.4E-01 J	MG/KG	CAS04-SD03-1209B	4/12	0.004 - 0.086	7.4E-01	N/A	1.7E+01 C*	N/A	N/A	NO	BSL
	5103-71-9	alpha-Chlordane	2.6E-03 J	6.0E-03 J	MG/KG	CAS04-SD03-1209B	2/12	0.002 - 0.0025	6.0E-03	N/A	1.6E+01 C*	N/A	N/A	NO	BSL
	12672-29-6	Aroclor-1248	3.3E-02 J	3.3E-02 J	MG/KG	CAS004-4-SD02-01-1199	1/12	0.023 - 0.12	3.3E-02	N/A	2.2E+00 C	N/A	N/A	NO	BSL
	11097-69-1	**Aroclor-1254**	**8.9E+00 J**	**8.9E+00 J**	**MG/KG**	**CAS04-SD03-1209B**	**1/12**	**0.02 - 0.11**	**8.9E+00**	**N/A**	**1.1E+00 C****	**N/A**	**N/A**	**YES**	**ASL-RSL**
	11096-82-5	Aroclor-1260	7.9E-03 J	5.8E-01	MG/KG	CAA03-SD02-1209B	9/12	0.022 - 0.12	5.8E-01	N/A	2.2E+00 C	N/A	N/A	NO	BSL
	60-57-1	**Dieldrin**	**3.4E-03 J**	**6.0E-01 J**	**MG/KG**	**CAS04-SD03-1209B**	**2/12**	**0.004 - 0.086**	**6.0E-01**	**N/A**	**3.0E-01 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	959-98-8	Endosulfan I	2.3E-02 J	2.3E-02 J	MG/KG	CAS04-SD03-1209B	1/12	0.002 - 0.0025	2.3E-02	N/A	3.7E+02 N	N/A	N/A	NO	BSL

Table 2.7

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Subsurface Sediment (4-8")
Exposure Medium: Subsurface Sediment (4-8")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	33213-65-9	Endosulfan II	8.6E-04 J	3.6E-01 J	MG/KG	CAS04-SD03-1209B	3/12	0.004 - 0.086	3.6E-01	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	1031-07-8	Endosulfan sulfate	3.2E-03 J	3.2E-03 J	MG/KG	CAS04-SD04-1209B	1/12	0.004 - 0.0049	3.2E-03	N/A	3.7E+02 N	N/A	N/A	NO	BSL
	72-20-8	Endrin	3.9E-02 J	5.2E-01	MG/KG	CAS04-SD03-1209B	3/12	0.004 - 0.086	5.2E-01	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	7421-93-4	Endrin aldehyde	1.4E-01 J	1.4E-01 J	MG/KG	CAS04-SD03-1209B	1/12	0.004 - 0.086	1.4E-01	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	53494-70-5	Endrin ketone	1.4E-01 J	1.4E-01 J	MG/KG	CAS04-SD03-1209B	1/12	0.004 - 0.086	1.4E-01	N/A	1.8E+01 N	N/A	N/A	NO	BSL
	5103-74-2	gamma-Chlordane	7.5E-04 J	3.4E-01 J	MG/KG	CAS04-SD03-1209B	3/12	0.002 - 0.044	3.4E-01	N/A	1.6E+01 C*	N/A	N/A	NO	BSL
	1024-57-3	Heptachlor epoxide	7.1E-04 J	2.3E-01 J	MG/KG	CAS04-SD03-1209B	2/12	0.002 - 0.044	2.3E-01	N/A	5.3E-01 C*	N/A	N/A	NO	BSL
	72-43-5	Methoxychlor	2.3E-01 J	2.3E-01 J	MG/KG	CAS04-SD03-1209B	1/12	0.02 - 0.44	2.3E-01	N/A	3.1E+02 N	N/A	N/A	NO	BSL
	7429-90-5	Aluminum	1.5E+03 L	2.6E+04	MG/KG	CAS04-SD01-1209B	12/12	26 - 36	2.6E+04	N/A	7.7E+04 N	N/A	N/A	NO	BSL
	7440-36-0	Antimony	1.0E-01 L	1.2E+00 L	MG/KG	CAS04-SD03-1209B	6/12	0.43 - 1.9	1.2E+00	N/A	3.1E+01 N	N/A	N/A	NO	BSL
	7440-38-2	**Arsenic**	**9.8E-01 J**	**1.5E+01 K**	**MG/KG**	**CAS04-SD01-1209B**	**12/12**	**0.68 - 2.5**	**1.5E+01**	**N/A**	**3.9E+00 C***	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-39-3	Barium	1.3E+01	1.3E+02	MG/KG	CAS04-SD04-1209B	10/12	0.43 - 0.6	1.3E+02	N/A	1.5E+04 N	N/A	N/A	NO	BSL
	7440-41-7	Beryllium	2.1E-01 J	1.0E+00	MG/KG	CAA03-SD03-1209B	11/12	0.43 - 0.6	1.0E+00	N/A	1.6E+02 N	N/A	N/A	NO	BSL
	7440-43-9	Cadmium	5.0E-02 J	7.2E+00	MG/KG	CAS004-4-SED01-01-1199	12/12	0.085 - 1.7	7.2E+00	N/A	7.0E+01 N	N/A	N/A	NO	BSL
	7440-70-2	Calcium	1.0E+03	1.5E+04 J	MG/KG	CAS004-4-SD04-01-1199	12/12	5.4 - 1242.8	1.5E+04	N/A	N/A	N/A	N/A	NO	NUT
	7440-47-3	**Chromium**	**7.0E+00**	**4.9E+01 K**	**MG/KG**	**CAS04-SD01-1209B**	**12/12**	**1.3 - 3.6**	**4.9E+01**	**N/A**	**2.9E+00 C**	**N/A**	**N/A**	**YES**	**ASL-RSL**
	7440-48-4	Cobalt	7.6E-01 J	4.1E+00 J	MG/KG	CAS04-SD01-1209B, CAS04-SD03-1209B	9/12	1.5 - 7.2	4.1E+00	N/A	2.3E+01 N	N/A	N/A	NO	BSL
	7440-50-8	Copper	2.8E+00	6.4E+01	MG/KG	CAS04-SD03-1209B	9/12	0.28 - 0.4	6.4E+01	N/A	3.1E+03 N	N/A	N/A	NO	BSL
	7439-89-6	Iron	4.5E+03 L	3.4E+04 J	MG/KG	CAA03-SD03-1209B	12/12	8.5 - 12	3.4E+04	N/A	5.5E+04 N	N/A	N/A	NO	BSL
	7439-92-1	Lead	4.2E+00	2.4E+02	MG/KG	CAS04-SD03-1209B	12/12	0.43 - 1.2	2.4E+02	N/A	4.0E+03 NL	N/A	N/A	NO	BSL
	7439-95-4	Magnesium	4.1E+02 J	3.2E+03 K	MG/KG	CAA03-SD03-1209B	12/12	4.3 - 12	3.2E+03	N/A	N/A	N/A	N/A	NO	NUT
	7439-96-5	Manganese	1.2E+01	9.2E+01 J	MG/KG	CAS04-SD03-1209B	12/12	0.43 - 1.2	9.2E+01	N/A	1.8E+03 N	N/A	N/A	NO	BSL
	7439-97-6	Mercury	1.0E-02 J	1.8E-01	MG/KG	CAS04-SD03-1209B	8/12	0.02 - 0.046	1.8E-01	N/A	2.3E+01 N	N/A	N/A	NO	BSL
	7440-02-0	Nickel	1.7E+00 J	2.3E+01	MG/KG	CAS04-SD03-1209B	12/12	3.4 - 9.6	2.3E+01	N/A	1.5E+03 N	N/A	N/A	NO	BSL
	7440-09-7	Potassium	3.5E+02 K	4.4E+03 K	MG/KG	CAA03-SD03-1209B	11/12	85 - 1087.9	4.4E+03	N/A	N/A	N/A	N/A	NO	NUT
	7440-22-4	Silver	7.0E-02 J	3.1E+00	MG/KG	CAS04-SD03-1209B	6/12	1.3 - 3.6	3.1E+00	N/A	3.9E+02 N	N/A	N/A	NO	BSL
	7440-23-5	Sodium	5.7E+01 J	5.7E+01 J	MG/KG	CAS004-4-SD02-01-1199	1/12	85 - 120	5.7E+01	N/A	N/A	N/A	N/A	NO	NUT
	7440-28-0	Thallium	3.9E-01 J	5.2E-01 J	MG/KG	CAS04-SD01-1209B	2/12	0.47 - 3.6	5.2E-01	N/A	N/A	N/A	N/A	NO	NTX
	7440-62-2	Vanadium	6.8E+00 J	6.4E+01 K	MG/KG	CAS04-SD01-1209B	12/12	2.1 - 6	6.4E+01	N/A	3.9E+02 N	N/A	N/A	NO	BSL
	7440-66-6	Zinc	1.4E+01 K	3.3E+02 K	MG/KG	CAS04-SD03-1209B	9/12	2.1 - 5	3.3E+02	N/A	2.3E+04 N	N/A	N/A	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] Oak Ridge National Laboratory (ORNL). May 17, 2010. Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online].
Residential Soil RSLs adjusted by 10 for carcinogens (based on 10^{-7} for carcinogens and HQ of 1.0 for noncarcinogens).

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/
To Be Considered

J = Estimated Value

K = Biased High

Table 2.7

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN - SITE 4

Cheatham Annex Areas of Concern, Williamsburg, Virginia

Site Investigation Report

Scenario Timeframe: Current/Future
Medium: Subsurface Sediment (4-8")
Exposure Medium: Subsurface Sediment (4-8")

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection

Available: http://epa-prgs.ornl.gov/chemicals/index.shtml

RSL value for Acenaphthene used as surrogate for Acenaphthylene.

RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.

RSL value for anthracene used as surrogate for phenanthrene.

RSL value for technical chlordane used as surrogate for alpha-chlordane.

RSL value for technical chlordane used as surrogate for gamma-chlordane.

RSL value for Chromium(VI) used as surrogate for chromium.

The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.

RSL value for Manganese (water) used as surrogate for manganese.

RSL value for Mercury (inorganic salts) used as surrogate for mercury.

RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.

RSL value for endrin used as surrogate for endrin aldehyde and endrin ketone.

[5] Rationale Codes

Selection Reason: Above Regional Screening Level (ASL-RSL)
No Toxicity Information (NTX), not quantified

Deletion Reason: Essential Nutrient (NUT)
Below Screening Level (BSL)

L = Biased Low

C = Carcinogenic

C* = where: N SL < 100X C SL

C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level

N = Noncarcinogenic

N/A = Not available or Not applicable

NL = Noncarcinogenic lead residential soil RSL not adjusted by dividing by 10.

S = saturation concentration higher than noncarcinogenic based RSL, therefore Csat used as screening level

TABLE 2.7a

Step 2 Sediment Screening - Risk Ratio, Maximum Detected Concentration

Cheatham Annex Areas of Concern, Williamsburg, Virginia

AOC 3/Site 4 - Sediment (4 - 8 inches), Upstream Pond

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)								
Benzo(a)pyrene	7 / 12	2.4E-01 J	CAS004-4-SD02-01-1199	1.5E-02	1E-06	NA	2E-05	NA
Pesticides/PCBs (mg/kg)								
Aroclor-1254	1 / 12	8.9E+00 J	CAS04-SD03-1209B	1.1E-01	1E-06	NA	8E-05	NA
Dieldrin	2 / 12	6.0E-01 J	CAS04-SD03-1209B	3.0E-02	1E-06	NA	2E-05	NA
Metals (mg/kg)								
Arsenic	12 / 12	1.5E+01 K	CAS04-SD01-1209B	3.9E-01	1E-06	NA	4E-05	NA
Chromium	12 / 12	4.9E+01 K	CAS04-SD01-1209B	2.9E-01	1E-06	NA	2E-04	NA
Cumulative Corresponding Hazard Index[c]						**NA**		
Cumulative Corresponding Cancer Risk[d]							**3E-04**	

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Constituent of Potential Concern

HI = Hazard Index

J = Estimated Value

K = Biased High

mg/kg = milligrams per kilogram

NA = Not available/not applicable

RSL = Regional Screening Levels

Table 2.7b

Step 3 Soil Screening - Risk Ratio, 95% UCL

Cheatham Annex Areas of Concern, Williamsburg, Virginia

AOC 3/Site 4 - Sediment (4 - 8 inches), Upstream Pond

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semivolatile Organic Compounds (mg/kg)									
Benzo(a)pyrene	7 / 12	1.4E-01	95% KM-t	1, 2, 3	1.5E-02	1E-06	NA	9E-06	NA
Pesticides (mg/kg)									
Aroclor-1254	1 / 12	8.9E+00	Max	7	1.1E-01	1E-06	NA	8E-05	NA
Dieldrin	2 / 12	6.0E-01	Max	7	3.0E-02	1E-06	NA	2E-05	NA
Metals (mg/kg)									
Arsenic	12 / 12	9.8E+00	95% Stud-t	1, 2, 3	3.9E-01	1E-06	NA	3E-05	NA
Chromium	12 / 12	3.1E+01	G-App	1, 3	2.9E-01	1E-06	NA	1E-04	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk[d]								**2E-04**	

[a] Corresponding Hazard Index equals 95% UCL divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituen

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05,

Constituents selected as COPCs are indicated by shading.

mg/kg = milligrams per kilogram

HI = Hazard Index

NA = Not available/not applicable

RSL = Regional Screening Levels

UCL = Upper Confidence Limit

ProUCL, Version 4.00.04 used to determine distribution of data and calculate 95% UCL, following recommendations

in users guide (USEPA. February 2009. ProUCL, Version 4.0. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max); 95% Student's-T test UCL (95% Stud-t); 95% Kaplan-Meier (t) UCL (95% KM-t); Approximate Gamma UCL (G-App).

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Anderson-Darling and/or Kolmogorov-Smirnov Tests indicate data are gamma distributed.

(4) Distribution tests are inconclusive (data are not normal, log-normal, or gamma-distributed).

(5) Maximum detected concentration because sample set less than 5 samples.

(6) Maximum value used because calculated 95% UCL exceeds maximum concentration.

(7) The maximum detected concentration was used as the UCL because there were too few distinct values.

Appendix B
Environmental Risk Assessment Screening

APPENDIX B

Ecological Risk Screening

An ecological risk screening was performed to determine the potential for ecological risks associated with direct exposure to site media (surface soil [0 to 6 inches], subsurface soil [6 to 24 inches], surface water, and sediment) at Sites 4, 9, and Area of Concern (AOC) 3. The results of the ecological risk screening provide a preliminary indication of potential risks from exposure to chemicals of potential concern (COPCs) identified for each site, and are used to help determine whether the sites require further evaluation (e.g., a baseline risk assessment or additional data collection) or if risks are acceptable.

B.1 Ecological Conceptual Site Model

The ecological conceptual site model (CSM) provides a brief summary of site conditions, potential contaminant migration pathways, and exposure pathways to potential receptors. Sections 3 through 5 provide details on the physical setting and history of each site.

Site 4 is located at the headwaters of an unnamed "upstream" pond (upstream of Youth Pond) and between Buildings CAD 11 and CAD 12 (**Figure 2-1**). AOC 3 consists of an approximately 20 foot by 20 foot by 10 foot high pile of metal banding along the north bank of the upstream pond near Site 4 and west of D Street. Both sites are mostly wooded; paved areas and open maintained grass areas exist adjacent to the buildings that border the sites to the north and west. Complete exposure pathways exist to lower trophic level terrestrial receptors (i.e., plants and soil invertebrates) and to terrestrial upper trophic level receptors (i.e., birds and mammals). There is the potential for transport, primarily through surface runoff, from these sites to the upstream pond and subsequent exposure to lower trophic level aquatic receptors (i.e., aquatic plants, aquatic and benthic invertebrates, fish, amphibians, and reptiles), as well as to upper trophic level aquatic receptors (i.e. birds and mammals).

Site 9 is located adjacent to the northwest comer of Building 16 and covers approximately 7,000 square feet (**Figure 1-2**). The site is in an industrial area and contains little vegetation. Some surface runoff from the site flows west toward a small drainage ditch that occurs in the adjacent wooded area. Complete exposure pathways exist to lower trophic level terrestrial receptors (i.e., plants and soil invertebrates) at the site and in the ditch area. Due to the small size of each area, exposures to terrestrial upper trophic level receptors (i.e., birds and mammals) are not considered significant and are not evaluated. Most surface runoff from Site 9 drains into storm sewers that occur north of the site and empty through culverts into two small, persistent freshwater streams that flow though the upland habitat surrounding Site 4. Water travels from the streams into the upstream pond. During periods of high flow, water drains from the upstream pond through culverts into Youth Pond and then through more culverts into the tidal York River. Youth Pond is not evaluated as part of this SI but will be included in a future study.

B.2 Ecological Risk Screening Methodology

The ecological risk screening was conducted using a two step process within the overall decision analysis process described in Section 1.1.1, which is comprised of three steps. The ecological risk assessment (ERA) process falls within Steps 2a and 2b of this overall process.

If a CERCLA-related release is suspected (Step 1 of the overall decision process), site-specific analytical data for detected constituents are compared to conservative ecological screening values and, for soil, background 95 percent upper tolerance limits (UTLs), where available (Step 2a). Medium-specific screening values used in the assessment, which are based upon lower trophic level exposures, are contained in **Table B-1** (soil), **Table B-2** (surface water), and **Table B-3** (sediment). Soil screenings were conducted for both surface samples (0 to 6 inches) and subsurface samples (6 to 24 inches) since ecological exposures are generally considered to be confined to the top two feet of the soil column. Soil screenings were conducted separately for Site 4, AOC 3, and Site 9.

All surface water and sediment data from the upstream pond collected for Site 4 and AOC 3 were combined. Data from the Site 4 streams were screened separate from the pond data. The surface water and sediment screenings used freshwater values for both surface water and sediment. The surface water screening values for several metals were adjusted based upon the mean measured hardness (324 mg/L for the streams and 193 mg/L for the pond). Equilibrium partitioning-based sediment screening values were adjusted based upon the mean measured total organic carbon (TOC) concentration (2.14 percent in stream surface sediment, 1.38 percent in stream subsurface sediment, 6.68 percent in pond surface sediment, and 2.64 percent in pond subsurface sediment). Separate screenings were conducted for surface (0 to 4 inches) and subsurface (4 to 8 inches) sediment in each aquatic habitat (pond and stream). Because ecological receptors do not typically have direct exposure to groundwater and surface water/sediment data were available from the water body (upstream pond) likely to receive groundwater discharge from Site 4 and AOC 3, groundwater data were not evaluated as part of this ecological risk screening.

The background soil UTLs were facility-specific values derived for Yorktown/CAX. These values, which are described in Section 1.1.1, have not yet been formally issued in a report but have been approved for use by the CAX Partnering Team. There are no background data for surface water and sediment and, therefore, a comparison to background levels was not performed for these two media.

If the maximum detected concentration exceeded both ecological screening values and background UTLs, exceeded either screening values or UTLs if only one of the two were available for a chemical, or neither a screening value or UTL was available, the chemical was identified as an initial COPC for that medium. This constituted Step 2a of the decision process and also corresponds to a screening level ERA (which is Step 2 of the ERA process outlined in USEPA [1997] and NAVFAC [2003]).

Food web exposures (for detected bioaccumulative constituents) for upper trophic level receptors were also modeled for terrestrial habitats at Site 4, terrestrial habitats at AOC 3, and for the upstream pond. No food web modeling was conducted for Site 9 based upon the CSM (Section B.1). Site 4 surface sediment data from the streams were not included in the aquatic food web modeling (only pond surface sediment data were used) because potential food web exposures in the streams are likely to be minor relative to the pond based upon their small size in relation to the pond. However, all surface water data (pond and stream) were combined to estimate drinking water exposures for both terrestrial and aquatic receptors. Terrestrial receptors were as follows: (1) meadow vole; (2) short-tailed shrew; (3) white-footed mouse; (4) red fox; (5) American robin; and (6) red-tailed hawk. Aquatic receptors were as follows: (1) raccoon; (2) mink; (3) muskrat; (4) marsh wren; (5) belted kingfisher; (6) great blue heron; and (7) mallard. Calculations are shown in **Appendix B**. If maximum exposure doses (calculated using maximum surface soil, surface water, and/or surface sediment concentrations) exceeded ingestion-based effect concentrations (toxicity reference values; TRVs), the chemical was identified as an initial COPC. This constituted Step 2a of the decision process.

For the screening value and background exceedances, and food web exceedances, that are likely attributable to a historic CERCLA-related release, an evaluation of the data using more realistic assumptions, if possible, was done. This more realistic evaluation (Step 2b of the decision process) was performed to help ensure appropriate perspective is considered regarding the release such that informed decisions on the need for further investigation or action can be made (which is Step 3 of the decision process). Step 2b of the decision process corresponds to the first step of a baseline ERA (which is Step 3A of the ERA process outlined in NAVFAC [2003]).

Where there are exceedances of the ecological screening values/background and/or the ingestion-based (food web) TRVs, more realistic evaluations considered the following types of information:

- The size of the site
- The type and quality of the habitat present on the site and in surrounding areas, and the potential receptors likely to be present
- The frequency and magnitude of screening value and background exceedances
- Average exposure concentrations and, for food web modeling, more realistic measures of accumulation factors and exposure parameters
- The spatial pattern of exceedances
- Additional screening values from the literature, where applicable
- Other site-specific factors that might be relevant to assessing potential exposures (e.g., soil type, bioavailability, fate, transport properties)

When more realistic evaluations of the available data were conducted, the rationale for those evaluations is included in the discussion. It is recognized that these more realistic evaluations may have uncertainty due to the limited amount of data generally available at the SI stage. However, these additional risk evaluations provide yet another line of evidence that, when considered with all other site-specific information and evaluations, increase the level of confidence by which conclusions for each site are drawn.

B.3 Ecological Risk Screening Results

The ecological risk screening was performed for surface soil and subsurface soil at all sites. Surface water and sediment data from Site 4 and AOC 3 for the upstream pond were combined for this evaluation. **Table B-4** lists the samples used in this evaluation and the spatial groupings. Sample locations are shown on **Figures 3-3, 4-2 and 5-1**.

B.3.1 Site 4

This section provides risk screenings for Site 4 surface and subsurface soils. Aquatic media are screened in Sections B.3.2 (streams) and B.3.3 (upstream pond).

B.3.1.1 Surface Soil

Eight metals (aluminum, copper, iron, lead, manganese, mercury, selenium, and zinc) and six pesticides (4,4'-DDT, aldrin, endrin, endrin aldehyde, endrin ketone, and gamma-chlordane) exceeded screening values based upon maximum detected concentrations (**Tables B-5 and B-6**). All of these chemicals, except manganese, also exceeded background UTLs, where available. Acetone and carbazole lacked both screening values and background UTLs. Thus, aluminum, copper, iron, lead, mercury, selenium, zinc, 4,4'-DDT, aldrin, endrin, endrin aldehyde, endrin ketone, gamma-chlordane, acetone, and carbazole were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (120 µg/kg) that was less than soil screening values for other, similar volatile organic compounds (**Table B-1**). Thus, this chemical was not identified as a refined COPC.

- Carbazole was detected in five surface soil samples at a maximum concentration of 250 µg/kg (0.25 mg/kg). While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentrations of this chemical are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting Lethal Concentration (survival) to 50 percent of the population (LC_{50}) and Effect Concentration (reproduction) to 50 percent of the population (EC_{50}) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg. The maximum concentration of carbazole (0.25 mg/kg) is below this effects concentration. Thus, carbazole was not identified as a refined COPC.

- The mean hazard quotients (HQs) for copper, iron, lead, selenium, zinc, 4,4'-DDT, and gamma-chlordane were less than one. Thus, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for aldrin (1.17), endrin (2.67), endrin aldehyde (4.85), endrin ketone (5.51), and mercury (2.25). These five chemicals were identified as refined COPCs.

- Aluminum exceeded its pH-based soil screening value in eight of 10 samples and the mean pH at the site was also less than the pH-based screening value. Aluminum also exceeded background in two of 10 samples. Thus, aluminum was identified as a refined COPC.

B.3.1.2 Subsurface Soil

Five metals (aluminum, iron, mercury, selenium, and zinc), four pesticides (4,4'-DDT, aldrin, endosulfan II, and endrin ketone), bis(2-ethylhexyl)phthalate, and di-n-butylphthalate exceeded screening values based upon maximum detected concentrations (**Tables B-7 and B-8**). All of these chemicals, except iron, also exceeded background UTLs, where available. Screening values and background UTLs were not available for acetone and 2-butanone. Thus, aluminum, mercury, selenium, zinc, 4,4'-DDT, aldrin, endosulfan II, endrin ketone, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, acetone, and 2-butanone were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone and 2-butanone, which did not have screening values, were detected at maximum concentrations (120 and 8.00 µg/kg, respectively) that were less than soil screening values for other, similar volatile organic compounds (**Table B-1**). Thus, these chemicals were not identified as refined COPCs.

- The mean HQs for selenium, zinc, 4,4'-DDT, endosulfan II, bis(2-ethylhexyl)phthalate, and di-n-butylphthalate were less than one. Thus, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for aldrin (1.09), endrin ketone (2.35), and mercury (2.75). These three chemicals were identified as refined COPCs.

- Aluminum exceeded its pH-based soil screening value in eight of nine samples and the mean pH at the site was also less than the pH-based screening value. Aluminum also exceeded background in three of nine samples. Thus, aluminum was identified as a refined COPC.

B.3.1.3 Terrestrial Food Web

HQs based upon maximum exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-9** (calculations are shown in **Appendix B**). Based upon a comparison to No Observed Adverse Effect Levels (NOAELs), arsenic, cadmium, chromium, lead, mercury, selenium, zinc, Aroclor-1242, and Aroclor-1260 had HQs exceeding one for one or more receptors. Thus, these nine chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- HQs based upon the 95 percent upper confidence limit (UCL) of the arithmetic mean exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-10** (calculations are shown in **Appendix B**). Based upon a comparison to NOAELs, mercury and Aroclor-1260 had HQs exceeding one for at least one receptor. There were no exceedances based upon the Lowest Observed Adverse Effect Level (LOAEL) or the Maximum Acceptable Toxicant Concentration (MATC).
- HQs based upon arithmetic mean exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-11** (calculations are shown in **Appendix B**). No chemical had a HQ that exceeded one based upon the NOAEL, MATC, or LOAEL.
- Because there were no exceedances based upon the MATC or LOAEL, no refined COPCs were identified for terrestrial food web exposures and risks from this exposure pathway are considered acceptable.

B.3.2 Site 4 Streams

This section evaluates the surface water and sediment from the three streams that drain to the upstream pond (**Figure 3-3**).

B.3.2.1 Surface Water

Four metals (aluminum, barium, iron, and manganese) exceeded screening values based upon maximum detected concentrations in unfiltered samples (**Tables B-12 and B-13**). Aluminum was not detected in filtered samples (filtered samples best reflect the potential bioavailability of metals to aquatic receptors; [USEPA, 2009; 1996]). Barium, iron, and manganese exceeded screening values based upon maximum detected concentrations in filtered samples. Thus, barium, iron, and manganese were identified as initial COPCs. Pyrene also exceeded screening values and was identified as an initial COPC.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The screening value for barium (4 µg/L) is very conservative and likely does not reflect the bioavailability of barium in the aquatic environment. Barium compounds have low toxicity to aquatic organisms, with the barium ion responsible for the toxic effects (Federal Register, 62[2]:366-372, 3 January 1997). In aquatic media, barium compounds are likely to precipitate out of solution as barium sulfate ($BaSO_4$) or barium carbonate ($BaCO_3$) when they react with the sulfate or carbonate present in most surface water. Thus, the barium is rendered essentially non-toxic and does not represent a risk to aquatic organisms. Based upon this, barium was not identified as a refined COPC in surface water.
- The mean HQ for manganese in filtered samples was less than one. Thus, this chemical was not identified as a refined COPC.

- The mean HQ (1.15) exceeded one for iron in filtered samples and the mean HQ for pyrene (6.20) also exceeded one. Thus, iron and pyrene were identified as refined COPCs.

B.3.2.2 Surface Sediment

Two metals (arsenic and barium), five pesticides (4,4′-DDD, 4,4′-DDE, 4,4′-DDT, endrin aldehyde, and gamma-chlordane), two PCBs (Aroclors 1254 and 1260), nine PAHs, and total PAHs (including both high molecular weight [HMW] and low molecular weight [LMW] PAHs) exceeded screening values based upon maximum detected concentrations (**Tables B-14 and B-15**). Screening values were not available for beryllium, thallium, endosulfan I, endosulfan II, endosulfan sulfate, heptachlor, 2-butanone, acetone, carbon disulfide, and tetrachloroethene. Thus, these 31 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The mean HQs for arsenic, all but one PAH, and total PAHs (including HMW and LMW PAH groups) were less than one. The mean HQ for dibenz(a,h)anthracene was just 1.08 and both total and HMW PAH HQs were less than one. Thus, these 13 chemicals were not identified as refined COPCs.

- Beryllium and thallium did not have available screening values. However, these metals are not known to be associated with any site activities. Thallium was detected in only one of five samples. The small range in beryllium concentrations (0.34 to 0.65 mg/kg) suggests that this chemical may be at background concentrations. Thus, these two metals were not identified as refined COPCs.

- Equilibrium partitioning (EqP) sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for all but one of the VOC, pesticide, and PCB initial COPCs (**Table B-14**). EqP sediment values were exceeded for only three of these chemicals (carbon disulfide, endosulfan I, and endosulfan sulfate) based upon maximum surface sediment concentrations but not based upon mean surface sediment concentrations (except for carbon disulfide). The maximum EqP-based HQ for carbon disulfide, which can be naturally produced in wetland environments, was only 1.10. Acetone, which did not have a screening value, was detected at a maximum concentration (230 µg/kg) that was less than available values for similar chemicals (such as 2-butanone). Thus, when bioavailability is considered for these chemicals, none were identified as refined COPCs.

- The mean HQ exceeded one for barium (1.18). However, this metal is not known to be associated with any site activities. The small range in barium concentrations (17.1 to 31.6 mg/kg) suggests that this chemical may be at background concentrations. Thus, barium was not identified as a refined COPC.

No refined COPCs were identified for this medium and risks from this exposure pathway are considered acceptable.

B.3.2.3 Subsurface Sediment

Seven metals (aluminum, arsenic, barium, cadmium, chromium, iron, and vanadium), five pesticides (4,4′-DDD, 4,4′-DDE, 4,4′-DDT, dieldrin, and endrin aldehyde), two PCBs (Aroclors 1254 and 1260), and two individual PAH compounds (but not total PAHs) exceeded screening values based upon maximum detected concentrations (**Tables B-16 and B-17**). Screening values were not available for beryllium, endosulfan I, endosulfan II, endosulfan sulfate, pentachlorophenol, 2-butanone, acetone, carbon disulfide, and tetrachloroethene. Thus, these 25 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The mean HQs for aluminum, arsenic, cadmium, chromium, iron, vanadium, the two PAHs, the two PCB Aroclors, and 4,4′-DDE less than one. Thus, these 11 chemicals were not identified as refined COPCs.
- Beryllium did not have an available screening value. However, this metal is not known to be associated with any site activities. Thus, this metal was not identified as a refined COPC.
- Equilibrium partitioning (EqP) sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for all but one of the VOC, SVOC, and pesticide initial COPCs (Table B-16). EqP sediment values were not exceeded for any of these chemicals based upon maximum subsurface sediment concentrations. Acetone, which did not have a screening value, was detected at a maximum concentration (130 μg/kg) that was less than available values for similar chemicals (such as 2-butanone). Thus, when bioavailability is considered for these chemicals, none were identified as refined COPCs.
- The mean HQ exceeded one for barium (1.47). Thus, barium was identified as a refined COPC.

B.3.3 Upstream Pond

This section evaluates the surface water and sediment from the upstream pond (**Figure 5-1**).

B.3.3.1 Surface Water

Six metals (aluminum, barium, cadmium, copper, iron, and manganese) exceeded screening values based upon maximum detected concentrations in unfiltered samples (**Tables B-18 and B-19**). Aluminum and copper were not detected in filtered samples. Only barium exceeded screening values based upon maximum detected concentrations in filtered samples. Benzo(a)pyrene and pyrene also exceeded screening values and were identified as initial COPCs. A screening value was not available for chrysene. Thus, barium, benzo(a)pyrene, pyrene, and chrysene were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The screening value for barium (4 μg/L) is very conservative and likely does not reflect the bioavailability of barium in the aquatic environment. Barium compounds have low toxicity to aquatic organisms, with the barium ion responsible for the toxic effects (Federal Register, 62[2]:366-372, 3 January 1997). In aquatic media, barium compounds are likely to precipitate out of solution as barium sulfate ($BaSO_4$) or barium carbonate ($BaCO_3$) when they react with the sulfate or carbonate present in most surface water. Thus, the barium is rendered essentially non-toxic and does not represent a risk to aquatic organisms. Based upon this, barium was not identified as a refined COPC in surface water.

- The mean HQ for benzo(a)pyrene (7.93) and pyrene (4.83) exceeded one. The mean concentration of chrysene was higher than screening values for some other PAHs (such as benzo[a]pyrene and pyrene). Thus, benzo(a)pyrene, pyrene, and chrysene were identified as refined COPCs.

B.3.3.2 Surface Sediment

Eleven metals (arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc), nine pesticides (4,4′-DDD, 4,4′-DDE, 4,4′-DDT, alpha-chlordane, dieldrin, endrin, endrin aldehyde, gamma-chlordane, and heptachlor epoxide), two PCBs (Aroclors 1254 and 1260), 15 individual PAH compounds, and total PAHs (including HMW and LMW PAHs) exceeded screening values based upon maximum detected concentrations (**Tables B-20 and B-21**). Screening values were not available for beryllium, thallium, endosulfan I, endosulfan II, endosulfan sulfate, heptachlor, methoxychlor, pentachlorophenol, 2-butanone, acetone, carbon disulfide, ethylbenzene, methyl acetate, methylcyclohexane, tetrachloroethene, toluene, and total xylenes. Thus, these 57 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The mean HQs for chromium, iron, mercury, nickel, alpha-chlordane, acenaphthene, fluoranthene, and phenanthrene were less than one. Thus, these eight chemicals were not identified as refined COPCs.

- Beryllium and thallium did not have available screening values. However, these metals are not known to be associated with any site activities. Thallium was detected in only two of 12 samples. The small range in beryllium concentrations (0.25 to 0.98 mg/kg) suggests that this chemical may be at background concentrations. Thus, these two metals were not identified as refined COPCs.

- Equilibrium partitioning (EqP) sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for most of the organic initial COPCs (**Table B-20**). EqP sediment values were exceeded for two of the PAHs, seven of the pesticides, and Aroclor-1254 based upon maximum surface sediment concentrations but not based upon mean surface sediment concentrations. Thus, when bioavailability is considered for these chemicals, none were identified as refined COPCs based upon mean surface sediment concentrations. However, total PAHs (including both the HMW and LMW groups) did exceed screening values based upon mean concentrations and were identified as refined COPCs (see below). Thus, the individual PAHs, as members of these groups, were also refined COPCs regardless of individual screening status. A number of pesticides (particularly 4,4′-DDD, 4,4′-DDE, 4,4′-DDT, dieldrin, endrin,

endrin aldehyde, endosulfan I, endosulfan II, heptachlor epoxide, and methoxyclor) and Aroclor-1254 were elevated in one sample (CAS04-SD03-1209A) located at the upstream end of the pond. Based upon the magnitude of the exceedances in this sample, these 11 chemicals were identified as refined COPCs.

- Methyl acetate and methylcyclohexane, which did not have screening values, were each detected in only a single sample at concentrations (5.00 and 4.00 µg/kg, respectively) that were less than available values for all other VOCs. Thus, neither of these chemicals was identified as a refined COPC. Acetone, which also did not have a screening value, was detected at a maximum concentration (270 µg/kg) that was less than available values for similar chemicals (such as 2-butanone). Thus, acetone was not identified as a refined COPC.
- The mean HQ exceeded one for arsenic (1.06), barium (2.96), cadmium (1.89), copper (1.26), lead (2.47), silver (1.49), zinc (1.11), total PAHs (1.66), HMW PAHs (1.39), and LMW PAHs (2.40). These 10 chemicals were identified as refined COPCs.

B.3.3.3 Subsurface Sediment

Thirteen metals (aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, vanadium, and zinc), ten pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, dieldrin, endrin, endrin aldehyde, endrin ketone, gamma-chlordane, and heptachlor epoxide), two PCBs (Aroclors 1254 and 1260), 11 individual PAH compounds, total PAHs (including LMW PAHs but not HMW PAHs), and di-n-butylphthalate exceeded screening values based upon maximum detected concentrations (**Tables B-22 and B-23**). Screening values were not available for beryllium, thallium, endosulfan I, endosulfan II, endosulfan sulfate, methoxychlor, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 2-butanone, 4-methyl-2-pentanone, acetone, methyl acetate, methylcyclohexane, and tetrachloroethene. Thus, these 53 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The mean HQs for aluminum, arsenic, chromium, copper, iron, mercury, nickel, silver, vanadium, zinc, alpha-chlordane, di-n-butylphthalate, nine of the PAHs, and total PAHs were less than one. Thus, these 22 chemicals were not identified as refined COPCs. Dibenz(a,h)anthracene was also not identified as a refined COPC because total PAHs and HMW PAHs (to which group it belongs) were not refined COPCs. LMW PAHs were not identified as refined COPCs based upon the low magnitude of the mean HQ (1.35), the low frequency of exceedance (1 of 12 samples), and because the only LMW PAH that exceeded screening values based upon mean concentrations (fluorene) did not exceed EqP-based values.
- Beryllium and thallium did not have available screening values. However, these metals are not known to be associated with any site activities. Thallium was detected in only two of 12 samples. The small range in beryllium concentrations (0.21 to 1.00 mg/kg) suggests that this chemical may be at background concentrations. Thus, these two metals were not identified as refined COPCs.

- Equilibrium partitioning (EqP) sediment values, which consider the bioavailablity of non-polar organic chemicals, were available for most of the organic initial COPCs (**Table B-22**). EqP sediment values were exceeded for eight of the pesticides and Aroclor-1254 based upon maximum subsurface sediment concentrations but not based upon mean subsurface sediment concentrations. Thus, when bioavailability is considered for these chemicals, none were identified as refined COPCs based upon mean subsurface sediment concentrations. However, a number of pesticides (particularly 4,4′-DDD, 4,4′-DDE, 4,4′-DDT, dieldrin, endosulfan I, endosulfan II, endrin, endrin aldehyde, endrin ketone, heptachlor epoxide, and methoxyclor) and Aroclor-1254 were elevated in one sample (CAS04-SD03-1209B) located at the upstream end of the pond. Based upon the magnitude of the exceedances in this sample, these 12 chemicals were identified as refined COPCs.

- Methyl acetate and methylcyclohexane, which did not have screening values, were each detected in only a single sample at concentrations (4.00 and 2.00 µg/kg, respectively) that were less than available values for all other VOCs. Thus, neither of these chemicals was identified as a refined COPC. Acetone, which also did not have a screening value, was detected at a maximum concentration (420 µg/kg) that was less than available values for similar chemicals (such as 2-butanone). Thus, acetone was not identified as a refined COPC.

- The mean HQ exceeded one for barium (1.85), cadmium (1.14), and lead (1.28). These three chemicals were identified as refined COPCs.

B.3.3.4 Aquatic Food Web

HQs based upon maximum exposure doses for each upper trophic level aquatic receptor are listed in **Table B-24** (calculations are shown in **Appendix B**). Based upon a comparison to NOAELs, arsenic, cadmium, chromium, copper, lead, mercury, selenium, zinc, Aroclor-1254, Aroclor-1260, 4,4′-DDE, 4,4′-DDT, dieldrin, and endrin had HQs exceeding one for one or more receptors. Thus, these 14 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- HQs based upon 95 percent UCL exposure doses for each upper trophic level aquatic receptor are listed in **Table B-25** (calculations are shown in **Appendix B**). Based upon a comparison to NOAELs, chromium, lead, mercury, zinc, Aroclor-1254, Aroclor-1260, 4,4′-DDE, 4,4′-DDT, and dieldrin had HQs exceeding one for at least one receptor. There were exceedances based upon the MATC for mercury, Aroclor-1254, and dieldrin, and based upon the LOAEL for Aroclor-1254.

- HQs based upon arithmetic mean exposure doses for each upper trophic level aquatic receptor are listed in **Table B-26** (calculations are shown in **Appendix B**). Based upon a comparison to NOAELs, mercury, zinc, Aroclor-1254, and dieldrin had HQs exceeding one for at least one receptor. There were exceedances based upon the MATC and LOAEL for Aroclor-1254.

- Based upon the exceedance of the MATC and LOAEL for the mean exposure scenario, Aroclor-1254 was identified as a refined COPC for aquatic food web exposures.

B.3.4 AOC 3

This section provides risk screenings for AOC 3 surface and subsurface soils. Aquatic media were screened in Section B.3.3 (upstream pond).

B.3.4.1 Surface Soil

Ten metals (aluminum, copper, iron, lead, manganese, mercury, nickel, selenium, thallium, and zinc), six pesticides (dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, and lindane), 3- and 4-methylphenol, LMW PAHs, and HMW PAHs exceeded screening values based upon maximum detected concentrations (**Tables B-27 and B-28**). All of these chemicals, except manganese, also exceeded background UTLs, where available. Screening values and background UTLs were not available for 2-butanone, acetone, benzaldehyde, carbazole, and dibenzofuran. Thus, aluminum, copper, iron, lead, mercury, nickel, selenium, thallium, zinc, dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, lindane, 3- and 4-methylphenol, LMW PAHs, HMW PAHs, 2-butanone, acetone, benzaldehyde, carbazole, and dibenzofuran were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone and 2-butanone, which did not have screening values, were detected at maximum concentrations (640 and 24.0 µg/kg, respectively) that were less than soil screening values for other, similar volatile organic compounds (**Table B-1**). Thus, these two chemicals were not identified as refined COPCs.
- Benzaldehyde, which also did not have a screening value, was detected at a maximum concentration (200 µg/kg) that was less than soil screening values for other, similar semi-volatile organic compounds (**Table B-1**). Thus, this chemical was not identified as a refined COPC.
- Carbazole and dibenzofuran were detected in 10 and one (of 11) surface soil samples, at maximum concentrations of 120,000 and 19,000 µg/kg (120 and 19.0 mg/kg), respectively. While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to these two chemicals, available data suggest that the maximum observed concentration of dibenzofuran, but not carbazole, are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). Comparable values for dibenzofuran were 400 and 130 mg/kg, respectively. In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole and 50 and 23 mg/kg, respectively, for dibenzofuran (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg for carbazole and 4.60 mg/kg for dibenzofuran. Maximum surface soil concentrations for both carbazole and dibenzofuran were above these effects concentrations. Thus, carbazole and dibenzofuran were identified as refined COPCs.

- The mean HQs for aluminum, copper, iron, lead, mercury, nickel, selenium, thallium, zinc, endosulfan sulfate, and 3- and 4-methylphenol were less than one. Thus, these 11 chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for dieldrin (5.78), endosulfan I (31.8), endrin (11.2), endrin aldehyde (2.97), lindane (10.3), LMW PAHs (4.09), and HMW PAHs (7.25). These seven chemicals (plus the individual PAH compounds that comprise the LMW and HMW PAH groups) were identified as refined COPCs.

B.3.4.2 Subsurface Soil

Four metals (aluminum, iron, manganese, and zinc) and three pesticides (endosulfan sulfate, endrin, and gamma-chlordane) exceeded screening values based upon maximum detected concentrations (**Tables B-29 and B-30**). All of these chemicals, except iron, also exceeded background UTLs, where available. Acetone, carbazole, and dibenzofuran lacked both screening values and background UTLs. Thus, aluminum, manganese, zinc, endosulfan sulfate, endrin, gamma-chlordane, acetone, carbazole, and dibenzofuran were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (240 µg/kg) that was less than soil screening values for other, similar volatile organic compounds (**Table B-1**). Thus, this chemical was not identified as a refined COPC.

- Carbazole and dibenzofuran were detected in five and two (of 11) subsurface soil samples, at maximum concentrations of 650 and 350 µg/kg (0.650 and 0.350 mg/kg), respectively. While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to these two chemicals, available data suggest that the maximum observed concentrations of these two chemicals are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). Comparable values for dibenzofuran were 400 and 130 mg/kg, respectively. In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole and 50 and 23 mg/kg, respectively, for dibenzofuran (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg for carbazole and 4.60 mg/kg for dibenzofuran. Maximum surface soil concentrations for carbazole and dibenzofuran were below these effects concentrations. Thus, these two chemicals were not identified as refined COPCs.

- The mean HQs for aluminum, manganese, zinc, endosulfan sulfate, and gamma-chlordane were less than one. Thus, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for endrin (6.15). This chemical was identified as a refined COPC.

B.3.4.3 Terrestrial Food Web

HQs based upon maximum exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-31** (calculations are shown in **Appendix B**). Based upon a comparison to NOAELs, arsenic, cadmium, chromium, lead, mercury, selenium, silver, zinc, Aroclor-1260, dieldrin, endosulfan I, endrin, and 11 PAHs had HQs exceeding one for one or more receptors. Thus, these 23 chemicals were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- HQs based upon 95 percent UCL exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-32** (calculations are shown in **Appendix B**). Based upon a comparison to NOAELs, dieldrin, chrysene, and pyrene had HQs exceeding one for at least one receptor. There were no exceedances based upon the LOAEL but one exceedance (for dieldrin) based upon the MATC.

- HQs based upon arithmetic mean exposure doses for each upper trophic level terrestrial receptor are listed in **Table B-33** (calculations are shown in **Appendix B**). Dieldrin had HQs exceeding one based upon the NOAEL. No chemical had a HQ that exceeded one based upon the MATC or LOAEL.

- Because there were no exceedances based upon the MATC or LOAEL for the mean exposure scenario, no refined COPCs were identified for terrestrial food web exposures and risks from this exposure pathway are considered acceptable.

B.3.5 Site 9

This section provides risk screenings for Site 9 surface and subsurface soils. Separate screening were conducted for the site and the drainage ditch.

B.3.5.1 Site Surface Soil

Four metals (copper, iron, manganese, and nickel) and three pesticides (dieldrin, endosulfan II, and endosulfan sulfate) exceeded screening values based upon maximum detected concentrations (**Tables B-34 and B-35**). All of these chemicals, except iron and manganese, also exceeded background UTLs, where available. Acetone and carbazole lacked both screening values and background UTLs. Thus, copper, nickel, dieldrin, endosulfan II, endosulfan sulfate, acetone, and carbazole were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (140 µg/kg) that was less than soil screening values for other, similar volatile organic compounds (**Table B-1**). Thus, this chemical was not identified as a refined COPC.

- Carbazole was detected in one surface soil sample at a maximum concentration of 2.70 µg/kg (0.0027 mg/kg). While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentrations of this chemical are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg. The maximum concentration of carbazole (0.0027 mg/kg) is below this effects concentration. Thus, carbazole was not identified as a refined COPC.
- The mean HQs for nickel, dieldrin, and endosulfan II were less than one. Thus, these chemicals were not identified as refined COPCs.
- The mean HQ exceeded one for copper (1.74) and endosulfan sulfate (1.48). These two chemicals were identified as refined COPCs.

B.3.5.2 Site Subsurface Soil

One metal (copper) and one pesticide (endosulfan sulfate) exceeded screening values based upon maximum detected concentrations (**Tables B-36 and B-37**). These chemicals also exceeded background UTLs, where available. A screening value and background UTL was not available for acetone. Thus, copper, endosulfan sulfate, and acetone were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Acetone, which did not have a screening value, was detected at a maximum concentration (93.0 µg/kg) that was less than soil screening values for other, similar volatile organic compounds (**Table B-1**). Thus, this chemical was not identified as a refined COPC.
- The mean HQs for copper and endosulfan sulfate were less than one. Thus, these two chemicals were not identified as refined COPCs.

No refined COPCs were identified for this medium and risks from this exposure pathway are considered acceptable.

B.3.5.3 Ditch Surface Soil

Two metals (mercury and selenium), six pesticides (4,4′-DDT, dieldrin, endosulfan II, endosulfan sulfate, endrin ketone, and gamma-chlordane), and Aroclor-1260 exceeded screening values based upon maximum detected concentrations (**Tables B-38 and B-39**). All of these chemicals also exceeded background UTLs, where available. Carbazole lacked both screening values and background UTLs. Thus, mercury, selenium, 4,4′-DDT, dieldrin, endosulfan II, endosulfan sulfate, endrin ketone, gamma-chlordane, Aroclor-1260, and carbazole were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- Carbazole was detected in one surface soil sample at a maximum concentration of 52.0 μg/kg (0.052 mg/kg). While there is little information regarding the potential toxicity to soil invertebrates and/or terrestrial plants following direct exposure to this chemical, available data suggest that the maximum observed concentrations of this chemical are too low to elicit adverse effects. In 21-day studies with oligochaete worms exposed to carbazole-spiked soils, the resulting LC_{50} (survival) and EC_{50} (reproduction) values were greater than 2,100 and 52 mg/kg, respectively (Sverdrup et al., 2002). In a similar 21-day study exposing collembolans (or springtails) to spiked soils, the LC_{50} and EC_{50} values were 2,500 and 35 mg/kg, respectively, for carbazole (Sverdrup et al., 2001). Applying an uncertainty factor of 5 (**Table B-4a**) to the lower of the two EC_{50} (chronic LOEC) values (to approximate a chronic NOEC) yields an effects concentration of 7.00 mg/kg. The maximum concentration of carbazole (0.052 mg/kg) is below this effects concentration. Thus, carbazole was not identified as a refined COPC.

- Although the mean HQ for Aroclor-1260 was less than one, this chemical was identified as a refined COPC because concentrations were higher in more recent samples and because concentrations were only just below screening values in the most downgradient sample.

- The mean HQ exceeded one for mercury (1.70), selenium (1.19), 4,4'-DDT (4.65), dieldrin (4.73), endosulfan II (9.26), endosulfan sulfate (30.1), endrin ketone (107), and gamma-chlordane (4.04). These eight chemicals were identified as refined COPCs.

B.3.5.4 Ditch Subsurface Soil

Two metals (mercury and selenium) and four pesticides (4,4'-DDT, endosulfan II, endosulfan sulfate, and gamma-chlordane) exceeded screening values based upon maximum detected concentrations (**Tables B-40 and B-41**). All of these chemicals, except selenium, also exceeded background UTLs, where available. Thus, mercury, 4,4'-DDT, endosulfan II, endosulfan sulfate, and gamma-chlordane were identified as initial COPCs.

The initial COPCs were then evaluated using more realistic assumptions to select refined COPCs, as follows:

- The mean HQs for mercury, 4,4'-DDT, and gamma-chlordane were less than one. Thus, these chemicals were not identified as refined COPCs.

- The mean HQ exceeded one for endosulfan II (1.72) and endosulfan sulfate (2.01). These two chemicals were identified as refined COPCs.

B.4 Ecological Risk Screening Conclusion

COPCs were identified for Site 4 surface and subsurface soils (aluminum, mercury, and several pesticides) but not for terrestrial food web exposures. Exceedances were typically of low magnitude and only mercury is possibly site related. Thus, ecological risks are likely to be low at this site.

COPCs were identified for AOC 3 surface soils (five pesticides and PAHs [including carbazole and dibenzofuran]) and subsurface soils (one pesticide) but not for terrestrial food web exposures. The pesticides are unlikely to be related to a CERCLA release. PAHs were highly elevated at two locations, one near the surface debris pile and the other adjacent to a building.

COPCs were identified in Site 4 stream surface water (iron and pyrene) and subsurface sediment (barium) but not surface sediment. The magnitude of the iron and barium exceedances was low. The pyrene exceedance was likely the result of a turbid sample since pyrene has a low water solubility so would typically be associated with particulates. Thus, it would not be expected to be retained in the water column but be deposited to sediments. Pyrene was not a COPC in sediments. Thus, ecological risks in the Site 4 streams are likely to be low.

The upstream pond serves as a repository for storm water runoff from developed areas within its watershed as well as from the sites evaluated as part of this SI. COPCs were identified in pond surface water (3 PAHs), surface sediment (seven metals, 10 pesticides, PAHs, and Aroclor-1254), and subsurface sediment (three metals, 11 pesticides, and Aroclor-1254), and for food web exposures (Aroclor-1254). Pesticide and PCB risks were largely driven by a single sample located near the upstream end of the pond.

COPCs were identified for Site 9 surface soils (copper and endosulfan sulfate) but not for subsurface soils. However, the pesticide is likely the result of historic use and not related to a release at the site. There was only a single exceedance of copper in a soil sample near the building. Ecological risks at Site 9 are expected to be minimal, especially considering the small size of the site and the low quality of the habitat present.

COPCs were identified for Site 9 ditch surface soils (Aroclor-1260, mercury, selenium, and six pesticides) and subsurface soils (two pesticides). However, the pesticides are likely the result of historic use within the watershed and subsequent runoff to the ditch, and not related to a release at the site. The magnitude of the metal exceedances was low and neither is likely site related. Potential ecological risks related to Aroclor-1260 were within acceptable bounds, however, concentrations were higher in more recent samples and were only just below screening values in the most downgradient sample. This suggests that the extent of potential migration via the ditch has not yet been fully characterized.

B.5 References

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Table B-1
Ecological Screening Values - Soil
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Chemical	Screening Value	Units	Reference	Comments
Explosives				
1,3,5-Trinitrobenzene	NSV	--	--	
1,3-Dinitrobenzene	NSV	--	--	
2,4,6-Trinitrotoluene	10,000	ug/kg	Talmage et al. 1999	Plant
2,4-Dinitrotoluene	11,000	ug/kg	NRCC 2006	Plant/Invertebrate
2,6-Dinitrotoluene	8,500	ug/kg	NRCC 2006	Plant/Invertebrate
2-Amino-4,6-dinitrotoluene	80,000	ug/kg	Talmage et al. 1999	Plant
2-Nitrotoluene	NSV	--	--	
3,5-Dinitroaniline	NSV	--	--	
3-Nitrotoluene	NSV	--	--	
4-Amino-2,6-dinitrotoluene	80,000	ug/kg	2-Amino-4,6-dinitrotoluene	Plant
4-Nitrotoluene	NSV	--	--	
HMX	10,000	ug/kg	Talmage et al. 1999	Invertebrate
Nitrobenzene	2,260	ug/kg	Efroymson et al. 1997b	LC50 of 226,000; UF of 100
Nitroglycerine	NSV	--	--	
Nitroguanidine	NSV	--	--	
Perchlorate	1,000	ug/kg	USEPA 2002	Invertebrate
PETN	NSV	--	--	
RDX	10,000	ug/kg	Talmage et al. 1999	Invertebrate
Tetryl	10,000	ug/kg	Talmage et al. 1999	Plant
Inorganics				
Aluminum	pH < 5.5	--	USEPA 2003a	Eco-SSL
Antimony	78.0	mg/kg	USEPA 2005a	Eco-SSL - Invertebrate
Arsenic	18.0	mg/kg	USEPA 2005b	Eco-SSL - Plant
Barium	330	mg/kg	USEPA 2005c	Eco-SSL - Invertebrate
Beryllium	40.0	mg/kg	USEPA 2005d	Eco-SSL - Invertebrate
Cadmium	32.0	mg/kg	USEPA 2005e	Eco-SSL - Plant
Chromium	64.0	mg/kg	CCME 2007	Soil Quality Guideline
Cobalt	13.0	mg/kg	USEPA 2005f	Eco-SSL - Plant
Copper	70.0	mg/kg	USEPA 2007a	Eco-SSL - Plant
Cyanide	15.8	mg/kg	MHSPE 2000	Geomean of target/intervention - complex
Iron	5 < pH > 8	--	USEPA 2003b	Eco-SSL

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Chemical	Screening Value	Units	Reference	Comments
Lead	120	mg/kg	USEPA 2005g	Eco-SSL - Plant
Manganese	220	mg/kg	USEPA 2007b	Eco-SSL - Plant
Mercury	0.10	mg/kg	Efroymson et al. 1997b	Invertebrate
Nickel	38.0	mg/kg	USEPA 2007c	Eco-SSL - Plant
Selenium	0.52	mg/kg	USEPA 2007d	Eco-SSL - Plant
Silver	560	mg/kg	USEPA 2006c	Eco-SSL - Plant
Thallium	1.00	mg/kg	Efroymson et al. 1997a	Plant
Vanadium	130	mg/kg	CCME 2007	Soil Quality Guideline
Zinc	120	mg/kg	USEPA 2007e	Eco-SSL - Invertebrate
Pesticides/PCBs				
4,4'-DDD	583	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
4,4'-DDE	114	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
4,4'-DDT	100	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Aldrin	3.63	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
alpha-BHC	226	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
alpha-Chlordane	11.0	ug/kg	MHSPE 2000	Geomean of target/intervention
Aroclor-1016	8,000	ug/kg	Efroymson et al. 1997a	Lowest EC50 (40,000); UF of 5
Aroclor-1221	8,000	ug/kg	Efroymson et al. 1997a	Lowest EC50 (40,000); UF of 5
Aroclor-1232	8,000	ug/kg	Efroymson et al. 1997a	Lowest EC50 (40,000); UF of 5
Aroclor-1242	8,000	ug/kg	Efroymson et al. 1997a	Lowest EC50 (40,000); UF of 5
Aroclor-1248	8,000	ug/kg	Efroymson et al. 1997a	Lowest EC50 (40,000); UF of 5
Aroclor-1254	8,000	ug/kg	Efroymson et al. 1997a	Lowest EC50 (40,000); UF of 5
Aroclor-1260	8,000	ug/kg	Efroymson et al. 1997a	Lowest EC50 (40,000); UF of 5
beta-BHC	342	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
delta-BHC	226	ug/kg	alpha-BHC	
Dieldrin	10.5	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Endosulfan I	6.32	ug/kg	MHSPE 2000	Geomean of target/intervention
Endosulfan II	6.32	ug/kg	MHSPE 2000	Geomean of target/intervention
Endosulfan sulfate	6.32	ug/kg	Endosulfan	
Endrin	1.95	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Endrin aldehyde	1.95	ug/kg	Endrin	
Endrin ketone	1.95	ug/kg	Endrin	

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Chemical	Screening Value	Units	Reference	Comments
gamma-BHC (Lindane)	7.75	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
gamma-Chlordane	11.0	ug/kg	MHSPE 2000	Geomean of target/intervention
Heptachlor	52.9	ug/kg	MHSPE 2000	Geomean of target/intervention
Heptachlor epoxide	52.9	ug/kg	Heptachlor	
Methoxychlor	500	ug/kg	Beyer 1990	B value
Toxaphene	500	ug/kg	Beyer 1990	B value
Semivolatile Organic Compounds				
1,1-Biphenyl	13,600	ug/kg	Efroymson et al. 1997a	EC50 (68,000); UF of 5
1,2,3-Trichlorobenzene	1,150	ug/kg	Efroymson et al. 1997b	LC50 of 115,000; UF of 100
1,2,4-Trichlorobenzene	1,270	ug/kg	Efroymson et al. 1997b	LC50 of 127,000; UF of 100
1,2-Dichlorobenzene	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
1,3-Dichlorobenzene	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
1,4-Dichlorobenzene	1,280	ug/kg	Efroymson et al. 1997b	LC50 of 128,000; UF of 100
2,2'-Oxybis(1-chloropropane)	NSV	--	--	
2,4,5-Trichlorophenol	1,350	ug/kg	Efroymson et al. 1997a	Plant NOEC
2,4,6-Trichlorophenol	580	ug/kg	Efroymson et al. 1997b	LC50 of 58,000; UF of 100
2,4-Dichlorophenol	500	ug/kg	Beyer 1990; CCME 2007	B value; IRC
2,4-Dimethylphenol	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
2,4-Dinitrophenol	20,000	ug/kg	Efroymson et al. 1997a	Plant NOEC
2,4-Dinitrotoluene	11,000	ug/kg	NRCC 2006	Plant/Invertebrate
2,6-Dinitrotoluene	8,500	ug/kg	NRCC 2006	Plant/Invertebrate
2-Chloronaphthalene	LMW PAH	--	--	
2-Chlorophenol	500	ug/kg	Beyer 1990; CCME 2007	B value; IRC
2-Methylnaphthalene	LMW PAH	--	--	
2-Methylphenol	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
2-Nitroaniline	NSV	--	--	
2-Nitrophenol	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
3,3'-Dichlorobenzidine	NSV	--	--	
3-Nitroaniline	NSV	--	--	
4,6-Dinitro-2-methylphenol	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
4-Bromophenyl-phenylether	NSV	--	--	
4-Chloro-3-methylphenol	500	ug/kg	Beyer 1990; CCME 2007	B value; IRC

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Chemical	Screening Value	Units	Reference	Comments
4-Chloroaniline	500	ug/kg	MHSPE 2000	Geomean of target/intervention
4-Chlorophenyl-phenylether	NSV	--	--	
4-Methylphenol	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
4-Nitroaniline	NSV	--	--	
4-Nitrophenol	380	ug/kg	Efroymson et al. 1997b	LC50 of 38,000; UF of 100
Acenaphthene	LMW PAH	--	--	
Acenaphthylene	LMW PAH	--	--	
Acetophenone	NSV	--	--	
Anthracene	LMW PAH	--	--	
Atrazine	11.9	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Benzaldehyde	NSV	--	--	
Benzo(a)anthracene	HMW PAH	--	--	
Benzo(a)pyrene	HMW PAH	--	--	
Benzo(b)fluoranthene	HMW PAH	--	--	
Benzo(g,h,i)perylene	HMW PAH	--	--	
Benzo(k)fluoranthene	HMW PAH	--	--	
Benzoic acid	NSV	--	--	
Benzyl alcohol	NSV	--	--	
bis(2-Chloroethoxy)methane	NSV	--	--	
bis(2-Chloroethyl)ether	NSV	--	--	
bis(2-Ethylhexyl)phthalate	30,000	ug/kg	CCME 2007	Plant; IRC
Butylbenzylphthalate	30,000	ug/kg	CCME 2007	Plant; IRC
Caprolactam	NSV	--	--	
Carbazole	NSV	--	--	
Chrysene	HMW PAH	--	--	
Dibenz(a,h)anthracene	HMW PAH	--	--	
Dibenzofuran	NSV	--	--	
Diethylphthalate	26,800	ug/kg	Efroymson et al. 1997a	EC50 (134,000); UF of 5
Dimethyl phthalate	10,640	ug/kg	Efroymson et al. 1997b	LC50 of 1,064,000; UF of 100
Di-n-butylphthalate	40,000	ug/kg	Efroymson et al. 1997a	LOEC (200,000); UF of 5
Di-n-octylphthalate	30,000	ug/kg	CCME 2007	Plant; IRC
Fluoranthene	LMW PAH	--	--	

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Chemical	Screening Value	Units	Reference	Comments
Fluorene	LMW PAH	--	--	
Hexachlorobenzene	1,000	ug/kg	Beyer 1990	B value
Hexachlorobutadiene	NSV	--	--	
Hexachlorocyclopentadiene	2,000	ug/kg	Efroymson et al. 1997a	LOEC (10,000); UF of 5
Hexachloroethane	NSV	--	--	
Indeno(1,2,3-cd)pyrene	HMW PAH	--	--	
Isophorone	NSV	--	--	
Naphthalene	LMW PAH	--	--	
Nitrobenzene	2,260	ug/kg	Efroymson et al. 1997b	LC50 of 226,000; UF of 100
n-Nitroso-di-n-propylamine	NSV	--	--	
n-Nitrosodiphenylamine	1,090	ug/kg	Efroymson et al. 1997b	LC50 of 109,000; UF of 100
PAH (HMW)	18,000	ug/kg	USEPA 2007f	Eco-SSL - Invertebrate
PAH (LMW)	29,000	ug/kg	USEPA 2007f	Eco-SSL - Invertebrate
Pentachlorophenol	5,000	ug/kg	USEPA 2007g	Eco-SSL - Plant
Phenanthrene	LMW PAH	--	--	
Phenol	1,880	ug/kg	Efroymson et al. 1997b	LC50 of 188,000; UF of 100
Pyrene	HMW PAH	--	--	
Volatile Organic Compounds				
1,1,1-Trichloroethane	1,025	ug/kg	MHSPE 2000	Geomean of target/intervention
1,1,2,2-Tetrachloroethane	5,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NSV	--	--	
1,1,2-Trichloroethane	2,000	ug/kg	MHSPE 2000	Geomean of target/intervention
1,1-Dichloroethane	548	ug/kg	MHSPE 2000	Geomean of target/intervention
1,1-Dichloroethene	173	ug/kg	MHSPE 2000	Geomean of target/intervention
1,2,3-Trichlorobenzene	1,150	ug/kg	Efroymson et al. 1997b	LC50 of 115,000; UF of 100
1,2,4-Trichlorobenzene	1,270	ug/kg	Efroymson et al. 1997b	LC50 of 127,000; UF of 100
1,2-Dibromo-3-chloropropane	NSV	--	--	
1,2-Dibromoethane	300	ug/kg	CCME 2007	IRC
1,2-Dichlorobenzene	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
1,2-Dichloroethane	2,190	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
1,2-Dichloropropane	38,800	ug/kg	Efroymson et al. 1997b	LC50 of 3,880,000; UF of 100
1,3-Dichlorobenzene	1,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC

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Chemical	Screening Value	Units	Reference	Comments
1,4-Dichlorobenzene	1,280	ug/kg	Efroymson et al. 1997b	LC50 of 128,000; UF of 100
2-Butanone	NSV	--	--	
2-Hexanone	NSV	--	--	
4-Methyl-2-pentanone	NSV	--	--	
Acetone	NSV	--	--	
Benzene	1,140	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Bromochloromethane	NSV	--	--	
Bromodichloromethane	NSV	--	--	
Bromoform	300	ug/kg	CCME 2007	Plant; IRC
Bromomethane	NSV	--	--	
Carbon disulfide	NSV	--	--	
Carbon tetrachloride	3,400	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Chlorobenzene	2,400	ug/kg	Efroymson et al. 1997b	LC50 of 240,000; UF of 100
Chloroethane	5,000	ug/kg	CCME 2007	IRC
Chloroform	1,844	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Chloromethane	5,000	ug/kg	CCME 2007	IRC
cis-1,2-Dichloroethene	447	ug/kg	MHSPE 2000	Geomean of target/intervention
cis-1,3-Dichloropropene	5,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC
Cumene (isopropylbenzene)	NSV	--	--	
Cyclohexane	6,000	ug/kg	Beyer 1990	B value
Dibromochloromethane	NSV	--	--	
Dichlorodifluoromethane(Freon-12)	NSV	--	--	
Ethylbenzene	1,815	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Methyl acetate	NSV	--	--	
Methylcyclohexane	NSV	--	--	
Methylene chloride	1,250	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Methyl-tert-butyl ether (MTBE)	NSV	--	--	
Styrene	64,000	ug/kg	Efroymson et al. 1997a	EC50 (320,000); UF of 5
Tetrachloroethene	179	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Toluene	40,000	ug/kg	Efroymson et al. 1997a	EC50 (200,000); UF of 5
trans-1,2-Dichloroethene	447	ug/kg	MHSPE 2000	Geomean of target/intervention
trans-1,3-Dichloropropene	5,000	ug/kg	Beyer 1990; CCME 2007	B value; IRC

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Chemical	Screening Value	Units	Reference	Comments
Trichloroethene	500	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Trichlorofluoromethane(Freon-11)	NSV	--	--	
Vinyl chloride	412	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
Xylene, total	1,300	ug/kg	MHSPE 2000; 2001	Geomean of target/SRC
NSV - No Screening Value				

Table B-2
Ecological Screening Values - Surface Water
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Chemical	Freshwater Screening Value	Units	Hardness (mg/L)	pH	Reference	Comments
Explosives						
1,3,5-Trinitrobenzene	11.0	ug/L			Talmage et al. 1999	SCV
1,3-Dinitrobenzene	17.0	ug/L			Talmage et al. 1999	SCV
2,4,6-Trinitrotoluene	93.0	ug/L			Talmage et al. 1999	SCV
2,4-Dinitrotoluene	44.0	ug/L			USEPA 2006b	SCV
2,6-Dinitrotoluene	81.0	ug/L			USEPA 2006b	SCV
2-Amino-4,6-dinitrotoluene	19.0	ug/L			Talmage et al. 1999	SCV
2-Nitrotoluene	3,400	ug/L			NAVFAC 2007	
3,5-Dinitroaniline	59.0	ug/L			Talmage et al. 1999	SCV
3-Nitrotoluene	750	ug/L			USEPA 2006b	
4-Amino-2,6-dinitrotoluene	19.0	ug/L			2-Amino-4,6-dinitrotoluene	
4-Nitrotoluene	1,900	ug/L			USEPA 2006b	
HMX	330	ug/L			Talmage et al. 1999	SCV
Nitrobenzene	270	ug/L			USEPA 2001	Acute/10
Nitroglycerine	138	ug/L			USEPA 2006b	
Nitroguanidine	220	ug/L			NAVFAC 2007	NOEC
Perchlorate	9,300	ug/L			Dean et al. 2004	CCC
PETN	85,000	ug/L			USEPA 2006b	
RDX	186	ug/L			Talmage et al. 1999	SCV
Tetryl	NSV	--			--	
Dissolved Metals						
Aluminum	87.0	ug/L			USEPA 2009	AWQC
Antimony	30.0	ug/L			Suter and Tsao 1996	FCV
Arsenic	150	ug/L			USEPA 2009	AWQC
Barium	4.00	ug/L			Suter and Tsao 1996	SCV
Beryllium	0.66	ug/L			Suter and Tsao 1996	SCV
Cadmium	0.25	ug/L	100		USEPA 2009	AWQC
Chromium	11.0	ug/L			USEPA 2009	AWQC
Cobalt	23.0	ug/L			Suter and Tsao 1996	SCV
Copper	8.96	ug/L	100		USEPA 2006a	AWQC
Iron	1,000	ug/L			USEPA 2009	AWQC

Table B-2 Ecological Screening Values - Surface Water Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*						
	Freshwater					
Chemical	Screening Value	Units	Hardness (mg/L)	pH	Reference	Comments
Lead	2.52	ug/L	100		USEPA 2009	AWQC
Manganese	120	ug/L			Suter and Tsao 1996	SCV
Mercury	0.77	ug/L			USEPA 2009	AWQC
Nickel	52.0	ug/L	100		USEPA 2009	AWQC
Selenium	4.61	ug/L			USEPA 2009	AWQC
Silver	0.36	ug/L			Suter and Tsao 1996	SCV
Thallium	12.0	ug/L			Suter and Tsao 1996	SCV
Vanadium	20.0	ug/L			Suter and Tsao 1996	SCV
Zinc	118	ug/L	100		USEPA 2009	AWQC
Inorganics (Total)						
Aluminum	87.0	ug/L			USEPA 2009	AWQC
Antimony	30.0	ug/L			Suter and Tsao 1996	FCV
Arsenic	150	ug/L			USEPA 2009	AWQC
Barium	4.00	ug/L			Suter and Tsao 1996	SCV
Beryllium	0.66	ug/L			Suter and Tsao 1996	SCV
Cadmium	0.27	ug/L	100		USEPA 2009	AWQC
Chromium	11.4	ug/L			USEPA 2009	AWQC
Cobalt	23.0	ug/L			Suter and Tsao 1996	SCV
Copper	9.33	ug/L	100		USEPA 2006a	AWQC
Cyanide	5.20	ug/L			USEPA 2009	AWQC
Iron	1,000	ug/L			USEPA 2009	AWQC
Lead	3.18	ug/L	100		USEPA 2009	AWQC
Manganese	120	ug/L			Suter and Tsao 1996	SCV
Mercury	0.91	ug/L			USEPA 2009	AWQC
Nickel	52.2	ug/L	100		USEPA 2009	AWQC
Selenium	5.00	ug/L			USEPA 2009	AWQC
Silver	0.36	ug/L			Suter and Tsao 1996	SCV
Thallium	12.0	ug/L			Suter and Tsao 1996	SCV
Vanadium	20.0	ug/L			Suter and Tsao 1996	SCV
Zinc	120	ug/L	100		USEPA 2009	AWQC

Table B-2 Ecological Screening Values - Surface Water Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*						
	Freshwater					
Chemical	Screening Value	Units	Hardness (mg/L)	pH	Reference	Comments
Pesticides/PCBs						
4,4'-DDD	0.011	ug/L			Suter and Tsao 1996	SCV
4,4'-DDE	0.013	ug/L			DDT value	
4,4'-DDT	0.013	ug/L			USEPA 1996	SCV
Aldrin	0.30	ug/L			USEPA 2001	Acute AWQC/10
alpha-BHC	2.20	ug/L			Suter and Tsao 1996	SCV
alpha-Chlordane	0.17	ug/L			Suter and Tsao 1996	SCV
Aroclor-1016	0.14	ug/L			Suter and Tsao 1996	SCV
Aroclor-1221	0.28	ug/L			Suter and Tsao 1996	SCV
Aroclor-1232	0.58	ug/L			Suter and Tsao 1996	SCV
Aroclor-1242	0.053	ug/L			Suter and Tsao 1996	SCV
Aroclor-1248	0.081	ug/L			Suter and Tsao 1996	SCV
Aroclor-1254	0.033	ug/L			Suter and Tsao 1996	SCV
Aroclor-1260	0.14	ug/L			Suter and Tsao 1996	SCV
beta-BHC	2.20	ug/L			Suter and Tsao 1996	SCV
delta-BHC	2.20	ug/L			Suter and Tsao 1996	SCV
Dieldrin	0.056	ug/L			USEPA 2009	AWQC - FCV
Endosulfan I	0.056	ug/L			USEPA 2009	AWQC
Endosulfan II	0.056	ug/L			USEPA 2009	AWQC
Endosulfan sulfate	0.056	ug/L			Endosulfan value	
Endrin	0.036	ug/L			USEPA 2009	AWQC - FCV
Endrin aldehyde	0.15	ug/L			Buchman 2008	
Endrin ketone	0.15	ug/L			Endrin aldehyde value	
gamma-BHC (Lindane)	0.08	ug/L			USEPA 1996	FCV
gamma-Chlordane	0.17	ug/L			Suter and Tsao 1996	SCV
Heptachlor	0.0069	ug/L			USEPA 1996	SCV
Heptachlor epoxide	0.0069	ug/L			Heptachlor value	
Methoxychlor	0.03	ug/L			USEPA 2009	AWQC
Toxaphene	0.011	ug/L			USEPA 1996	SCV
Semivolatile Organic Compounds						
1,1-Biphenyl	14.0	ug/L			USEPA 1996	SCV

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Chemical	Freshwater Screening Value	Units	Hardness (mg/L)	pH	Reference	Comments
1,2,3-Trichlorobenzene	8.00	ug/L			USEPA 2006b	
1,2,4-Trichlorobenzene	110	ug/L			Suter and Tsao 1996	SCV
1,2-Dichlorobenzene	14.0	ug/L			USEPA 1996	SCV
1,3-Dichlorobenzene	71.0	ug/L			USEPA 1996	SCV
1,4-Dichlorobenzene	15.0	ug/L			USEPA 1996	SCV
2,2'-Oxybis(1-chloropropane)	NSV	--			--	
2,4,5-Trichlorophenol	63.0	ug/L			Buchman 2008	
2,4,6-Trichlorophenol	4.90	ug/L			Buchman 2008	
2,4-Dichlorophenol	11.0	ug/L			USEPA 2006b	SCV
2,4-Dimethylphenol	100	ug/L			Buchman 2008	
2,4-Dinitrophenol	19.0	ug/L			Buchman 2008	
2,4-Dinitrotoluene	44.0	ug/L			USEPA 2006b	SCV
2,6-Dinitrotoluene	81.0	ug/L			USEPA 2006b	SCV
2-Chloronaphthalene	0.40	ug/L			Buchman 2008	
2-Chlorophenol	24.0	ug/L			USEPA 2006b	FCV
2-Methylnaphthalene	330	ug/L			Buchman 2008	
2-Methylphenol	13.0	ug/L			Suter and Tsao 1996	SCV
2-Nitroaniline	NSV	--			--	
2-Nitrophenol	1,920	ug/L			USEPA 2006b	
3,3'-Dichlorobenzidine	4.50	ug/L			USEPA 2006b	FCV
3-Nitroaniline	NSV	--			--	
4,6-Dinitro-2-methylphenol	2.30	ug/L			USEPA 2001	
4-Bromophenyl-phenylether	1.50	ug/L			USEPA 1996	SCV
4-Chloro-3-methylphenol	0.30	ug/L			USEPA 2001	
4-Chloroaniline	232	ug/L			USEPA 2006b	
4-Chlorophenyl-phenylether	NSV	--			--	
4-Methylphenol	543	ug/L			USEPA 2006b	
4-Nitroaniline	NSV	--			--	
4-Nitrophenol	300	ug/L			Suter and Tsao 1996	SCV
Acenaphthene	23.0	ug/L			USEPA 1996	FCV
Acenaphthylene	4,840	ug/L			Buchman 2008	

Table B-2 Ecological Screening Values - Surface Water Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*						
	Freshwater					
Chemical	Screening Value	Units	Hardness (mg/L)	pH	Reference	Comments
Acetophenone	NSV	--			--	
Anthracene	0.73	ug/L			Suter and Tsao 1996	SCV
Atrazine	1.80	ug/L			USEPA 2006b	
Benzaldehyde	NSV	--			--	
Benzo(a)anthracene	0.027	ug/L			Suter and Tsao 1996	SCV
Benzo(a)pyrene	0.014	ug/L			Suter and Tsao 1996	SCV
Benzo(b)fluoranthene	9.07	ug/L			Buchman 2008	
Benzo(g,h,i)perylene	7.64	ug/L			Buchman 2008	
Benzo(k)fluoranthene	9.07	ug/L			Benzo(b)fluoranthene value	
Benzoic acid	42.0	ug/L			Suter and Tsao 1996	SCV
Benzyl alcohol	8.60	ug/L			Suter and Tsao 1996	SCV
bis(2-Chloroethoxy)methane	NSV	--			--	
bis(2-Chloroethyl)ether	1,900	ug/L			Buchman 2008	
bis(2-Ethylhexyl)phthalate	32.0	ug/L			USEPA 1996	SCV
Butylbenzylphthalate	19.0	ug/L			USEPA 1996	SCV
Caprolactam	NSV	--			--	
Carbazole	NSV	--			--	
Chrysene	NSV	--			--	
Dibenz(a,h)anthracene	NSV	--			--	
Dibenzofuran	3.70	ug/L			Suter and Tsao 1996	SCV
Diethylphthalate	270	ug/L			USEPA 2008	SCV
Dimethyl phthalate	330	ug/L			USEPA 2001	
Di-n-butylphthalate	35.0	ug/L			Suter and Tsao 1996	SCV
Di-n-octylphthalate	22.0	ug/L			USEPA 2006b	
Fluoranthene	8.10	ug/L			USEPA 1996	FCV
Fluorene	3.90	ug/L			USEPA 1996	SCV
Hexachlorobenzene	3.68	ug/L			Buchman 2008	
Hexachlorobutadiene	1.30	ug/L			USEPA 2006b	
Hexachlorocyclopentadiene	1.04	ug/L			Buchman 2008	LOEL/5
Hexachloroethane	12.0	ug/L			USEPA 1996	SCV
Indeno(1,2,3-cd)pyrene	4.31	ug/L			Buchman 2008	

Table B-2 Ecological Screening Values - Surface Water Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*						
	Freshwater					
Chemical	Screening Value	Units	Hardness (mg/L)	pH	Reference	Comments
Isophorone	1,170	ug/L			USEPA 2001	
Naphthalene	12.0	ug/L			Suter and Tsao 1996	SCV
Nitrobenzene	270	ug/L			USEPA 2001	Acute/10
n-Nitroso-di-n-propylamine	NSV	--			--	
n-Nitrosodiphenylamine	210	ug/L			Suter and Tsao 1996	SCV
Pentachlorophenol	15.0	ug/L		7.8	USEPA 2009	AWQC
Phenanthrene	6.30	ug/L			USEPA 1996	FCV
Phenol	110	ug/L			Suter and Tsao 1996	SCV
Pyrene	0.025	ug/L			USEPA 2006b	
Volatile Organic Compounds						
1,1,1-Trichloroethane	11.0	ug/L			Suter and Tsao 1996	SCV
1,1,2,2-Tetrachloroethane	610	ug/L			Suter and Tsao 1996	SCV
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NSV	--			--	
1,1,2-Trichloroethane	1,200	ug/L			Suter and Tsao 1996	SCV
1,1-Dichloroethane	47.0	ug/L			Suter and Tsao 1996	SCV
1,1-Dichloroethene	25.0	ug/L			Suter and Tsao 1996	SCV
1,2,3-Trichlorobenzene	8.00	ug/L			USEPA 2006b	
1,2,4-Trichlorobenzene	110	ug/L			Suter and Tsao 1996	SCV
1,2-Dibromo-3-chloropropane	NSV	--			--	
1,2-Dibromoethane	NSV	--			--	
1,2-Dichlorobenzene	14.0	ug/L			USEPA 1996	SCV
1,2-Dichloroethane	910	ug/L			Suter and Tsao 1996	SCV
1,2-Dichloropropane	525	ug/L			USEPA 2001	
1,3-Dichlorobenzene	71.0	ug/L			USEPA 1996	SCV
1,4-Dichlorobenzene	15.0	ug/L			USEPA 1996	SCV
2-Butanone	14,000	ug/L			Suter and Tsao 1996	SCV
2-Hexanone	99.0	ug/L			Suter and Tsao 1996	SCV
4-Methyl-2-pentanone	170	ug/L			Suter and Tsao 1996	SCV
Acetone	1,500	ug/L			Suter and Tsao 1996	SCV
Benzene	130	ug/L			Suter and Tsao 1996	SCV
Bromochloromethane	NSV	--			--	

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Chemical	Freshwater Screening Value	Units	Hardness (mg/L)	pH	Reference	Comments
Bromodichloromethane	NSV	--			--	
Bromoform	320	ug/L			USEPA 1996	SCV
Bromomethane	110	ug/L			USEPA 2001	
Carbon disulfide	0.92	ug/L			Suter and Tsao 1996	SCV
Carbon tetrachloride	240	ug/L			USEPA 1996	SCV
Chlorobenzene	64.0	ug/L			Suter and Tsao 1996	SCV
Chloroethane	NSV	--			--	
Chloroform	28.0	ug/L			Suter and Tsao 1996	SCV
Chloromethane	5,500	ug/L			USEPA 2001	
cis-1,2-Dichloroethene	590	ug/L			Suter and Tsao 1996	SCV
cis-1,3-Dichloropropene	24.4	ug/L			USEPA 2001	
Cumene (isopropylbenzene)	2.60	ug/L			USEPA 2006b	
Cyclohexane	NSV	--			--	
Dibromochloromethane	NSV	--			--	
Dichlorodifluoromethane(Freon-12)	NSV	--			--	
Ethylbenzene	290	ug/L			USEPA 1996	SCV
Methyl acetate	NSV	--			--	
Methylcyclohexane	NSV	--			--	
Methylene chloride	2,200	ug/L			Suter and Tsao 1996	SCV
Methyl-tert-butyl ether (MTBE)	11,070	ug/L			USEPA 2006b	
Styrene	72.0	ug/L			USEPA 2006b	
Tetrachloroethene	98.0	ug/L			Suter and Tsao 1996	SCV
Toluene	9.80	ug/L			Suter and Tsao 1996	SCV
trans-1,2-Dichloroethene	590	ug/L			Suter and Tsao 1996	SCV
trans-1,3-Dichloropropene	24.4	ug/L			USEPA 2001	
Trichloroethene	47.0	ug/L			Suter and Tsao 1996	SCV
Trichlorofluoromethane(Freon-11)	NSV	--			--	
Vinyl chloride	930	ug/L			USEPA 2006b	FCV
Xylene, total	13.0	ug/L			Suter and Tsao 1996	SCV

NSV - No Screening Value

Table B-3 Ecological Screening Values - Sediment Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*								
	Fresh Sediment				Fresh Sediment EqP			
Chemical	Screening Value	Units	Reference	Comments	Screening Value	Units	TOC (%)	Reference
Explosives								
1,3,5-Trinitrobenzene	NSV	--	--		2.40	ug/kg	1	Talmage et al. 1999
1,3-Dinitrobenzene	NSV	--	--		6.70	ug/kg	1	Talmage et al. 1999
2,4,6-Trinitrotoluene	NSV	--	--		92.0	ug/kg	1	Talmage et al. 1999
2,4-Dinitrotoluene	NSV	--	--		41.6	ug/kg	1	USEPA 2006b
2,6-Dinitrotoluene	NSV	--	--		55.8	ug/kg	1	Calculated
2-Amino-4,6-dinitrotoluene	NSV	--	--		13.2	ug/kg	1	NAVFAC 2007
2-Nitrotoluene	NSV	--	--		6,204	ug/kg	1	NAVFAC 2007
3,5-Dinitroaniline	NSV	--	--		NSV	--		--
3-Nitrotoluene	NSV	--	--		1,922	ug/kg	1	NAVFAC 2007
4-Amino-2,6-dinitrotoluene	NSV	--	--		23.2	ug/kg	1	NAVFAC 2007
4-Nitrotoluene	NSV	--	--		4,062	ug/kg	1	USEPA 2006b
HMX	NSV	--	--		4.74	ug/kg	1	Talmage et al. 1999
Nitrobenzene	NSV	--	--		1,779	ug/kg	1	NAVFAC 2007
Nitroglycerine	NSV	--	--		NSV	--		--
Nitroguanidine	NSV	--	--		NSV	--		--
Perchlorate	NSV	--	--		NSV	--		--
PETN	NSV	--	--		NSV	--		--
RDX	NSV	--	--		12.7	ug/kg	1	Talmage et al. 1999
Tetryl	NSV	--	--		NSV	--		--
Inorganics								
Aluminum	25,500	mg/kg	Buchman 2008	ARCS TEL	N/A	--		--
Antimony	3.00	mg/kg	Buchman 2008	UET	N/A	--		--
Arsenic	9.79	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--
Barium	20.0	mg/kg	MacDonald et al. 2003	TEC	N/A	--		--
Beryllium	NSV	--	--		N/A	--		--
Cadmium	0.99	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--
Chromium	43.4	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--
Cobalt	50.0	mg/kg	Persuad et al. 1993	OWDG	N/A	--		--
Copper	31.6	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--

Table B-3 Ecological Screening Values - Sediment Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*								
	Fresh Sediment				Fresh Sediment EqP			
Chemical	Screening Value	Units	Reference	Comments	Screening Value	Units	TOC (%)	Reference
Cyanide	NSV	--	--		N/A	--		--
Iron	20,000	mg/kg	Persuad et al. 1993	LEL	N/A	--		--
Lead	35.8	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--
Manganese	460	mg/kg	Persuad et al. 1993	LEL	N/A	--		--
Mercury	0.18	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--
Nickel	22.7	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--
Selenium	2.00	mg/kg	USEPA 2006b		N/A	--		--
Silver	1.00	mg/kg	MacDonald et al. 2003	TEC	N/A	--		--
Thallium	NSV	--	--		N/A	--		--
Vanadium	57.0	mg/kg	Buchman 2008	AET	N/A	--		--
Zinc	121	mg/kg	MacDonald et al. 2000a	TEC	N/A	--		--
Pesticides/PCBs								
4,4'-DDD	4.88	ug/kg	MacDonald et al. 2000a	TEC	110	ug/kg	1	Jones et al. 1997
4,4'-DDE	3.16	ug/kg	MacDonald et al. 2000a	TEC	340	ug/kg	1	DDT value
4,4'-DDT	4.16	ug/kg	MacDonald et al. 2000a	TEC	340	ug/kg	1	Jones et al. 1997
Aldrin	2.00	ug/kg	Persuad et al. 1993	LEL	NSV	--		--
alpha-BHC	6.00	ug/kg	Persuad et al. 1993	LEL	120	ug/kg	1	Jones et al. 1997
alpha-Chlordane	3.24	ug/kg	MacDonald et al. 2000a	TEC	2,800	ug/kg	1	Jones et al. 1997
Aroclor-1016	59.8	ug/kg	MacDonald et al. 2000b	TEC	120	ug/kg	1	Aroclor-1221 value
Aroclor-1221	59.8	ug/kg	MacDonald et al. 2000b	TEC	120	ug/kg	1	Jones et al. 1997
Aroclor-1232	59.8	ug/kg	MacDonald et al. 2000b	TEC	600	ug/kg	1	Jones et al. 1997
Aroclor-1242	59.8	ug/kg	MacDonald et al. 2000b	TEC	170	ug/kg	1	Jones et al. 1997
Aroclor-1248	59.8	ug/kg	MacDonald et al. 2000b	TEC	1,000	ug/kg	1	Jones et al. 1997
Aroclor-1254	59.8	ug/kg	MacDonald et al. 2000b	TEC	810	ug/kg	1	Jones et al. 1997
Aroclor-1260	59.8	ug/kg	MacDonald et al. 2000b	TEC	810	ug/kg	1	Aroclor-1254 value
beta-BHC	5.00	ug/kg	Persuad et al. 1993	LEL	120	ug/kg	1	Jones et al. 1997
delta-BHC	3.00	ug/kg	Persuad et al. 1993	LEL	120	ug/kg	1	Jones et al. 1997
Dieldrin	1.90	ug/kg	MacDonald et al. 2000a	TEC	52.0	ug/kg	1	USEPA 1996
Endosulfan I	NSV	--	--		2.90	ug/kg	1	USEPA 1996
Endosulfan II	NSV	--	--		14.0	ug/kg	1	USEPA 1996

Table B-3 Ecological Screening Values - Sediment Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*								
	Fresh Sediment				Fresh Sediment EqP			
Chemical	Screening Value	Units	Reference	Comments	Screening Value	Units	TOC (%)	Reference
Endosulfan sulfate	NSV	--	--		5.40	ug/kg	1	USEPA 1996
Endrin	2.22	ug/kg	MacDonald et al. 2000a	TEC	20.0	ug/kg	1	USEPA 1996
Endrin aldehyde	2.22	ug/kg	Endrin		20.0	ug/kg	1	Endrin
Endrin ketone	2.22	ug/kg	Endrin		20.0	ug/kg	1	Endrin
gamma-BHC (Lindane)	2.37	ug/kg	MacDonald et al. 2000a	TEC	3.70	ug/kg	1	USEPA 1996
gamma-Chlordane	3.24	ug/kg	MacDonald et al. 2000a	TEC	2,800	ug/kg	1	Jones et al. 1997
Heptachlor	NSV	--	--		68.0	ug/kg	1	Jones et al. 1997
Heptachlor epoxide	2.47	ug/kg	MacDonald et al. 2000a	TEC	68.0	ug/kg	1	Heptachlor
Methoxychlor	NSV	--	--		19.0	ug/kg	1	USEPA 1996
Toxaphene	NSV	--	--		28.0	ug/kg	1	USEPA 1996
Semivolatile Organic Compounds								
1,1-Biphenyl	NSV	--	--		1,100	ug/kg	1	USEPA 1996
1,2,3-Trichlorobenzene	NSV	--	--		858	ug/kg	1	USEPA 2006b
1,2,4-Trichlorobenzene	NSV	--	--		9,200	ug/kg	1	USEPA 1996
1,2-Dichlorobenzene	NSV	--	--		340	ug/kg	1	USEPA 1996
1,3-Dichlorobenzene	NSV	--	--		1,700	ug/kg	1	USEPA 1996
1,4-Dichlorobenzene	NSV	--	--		350	ug/kg	1	USEPA 1996
2,2'-Oxybis(1-chloropropane)	NSV	--	--		NSV	--		--
2,4,5-Trichlorophenol	NSV	--	--		NSV	--		--
2,4,6-Trichlorophenol	NSV	--	--		213	ug/kg	1	USEPA 2006b
2,4-Dichlorophenol	NSV	--	--		117	ug/kg	1	USEPA 2006b
2,4-Dimethylphenol	NSV	--	--		NSV	--		--
2,4-Dinitrophenol	NSV	--	--		NSV	--		--
2,4-Dinitrotoluene	NSV	--	--		41.6	ug/kg	1	USEPA 2006b
2,6-Dinitrotoluene	NSV	--	--		NSV	--		--
2-Chloronaphthalene	NSV	--	--		NSV	--		--
2-Chlorophenol	NSV	--	--		31.2	ug/kg	1	USEPA 2006b
2-Methylnaphthalene	NSV	--	--		NSV	--		--
2-Methylphenol	NSV	--	--		NSV	--		--
2-Nitroaniline	NSV	--	--		NSV	--		--

Table B-3
Ecological Screening Values - Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Fresh Sediment Screening Value	Fresh Sediment Units	Reference	Comments	Fresh Sediment EqP Screening Value	Fresh Sediment EqP Units	TOC (%)	Reference
2-Nitrophenol	NSV	--	--		NSV	--		--
3,3'-Dichlorobenzidine	NSV	--	--		127	ug/kg	1	USEPA 2006b
3-Nitroaniline	NSV	--	--		NSV	--		--
4,6-Dinitro-2-methylphenol	NSV	--	--		NSV	--		--
4-Bromophenyl-phenylether	NSV	--	--		1,300	ug/kg	1	USEPA 1996
4-Chloro-3-methylphenol	NSV	--	--		NSV	--		--
4-Chloroaniline	NSV	--	--		NSV	--		--
4-Chlorophenyl-phenylether	NSV	--	--		NSV	--		--
4-Methylphenol	NSV	--	--		NSV	--		--
4-Nitroaniline	NSV	--	--		NSV	--		--
4-Nitrophenol	NSV	--	--		NSV	--		--
Acenaphthene	290	ug/kg	Buchman 2008	UET	620	ug/kg	1	USEPA 1996
Acenaphthylene	160	ug/kg	Buchman 2008	UET	NSV	--		--
Acetophenone	NSV	--	--		NSV	--		--
Anthracene	57.2	ug/kg	MacDonald et al. 2000a	TEC	220	ug/kg	1	Jones et al. 1997
Atrazine	NSV	--	--		6.62	ug/kg	1	USEPA 2006b
Benzaldehyde	NSV	--	--		NSV	--		--
Benzo(a)anthracene	108	ug/kg	MacDonald et al. 2000a	TEC	110	ug/kg	1	Jones et al. 1997
Benzo(a)pyrene	150	ug/kg	MacDonald et al. 2000a	TEC	140	ug/kg	1	Jones et al. 1997
Benzo(b)fluoranthene	240	ug/kg	Benzo(k)fluoanthene value		NSV	--		--
Benzo(g,h,i)perylene	170	ug/kg	Persuad et al. 1993	LEL	NSV	--		--
Benzo(k)fluoranthene	240	ug/kg	Persuad et al. 1993	LEL	NSV	--		--
Benzoic acid	NSV	--	--		NSV	--		--
Benzyl alcohol	NSV	--	--		NSV	--		--
bis(2-Chloroethoxy)methane	NSV	--	--		NSV	--		--
bis(2-Chloroethyl)ether	NSV	--	--		NSV	--		--
bis(2-Ethylhexyl)phthalate	750	ug/kg	Buchman 2008	UET	890,000	ug/kg	1	Jones et al. 1997
Butylbenzylphthalate	NSV	--	--		11,000	ug/kg	1	USEPA 1996
Caprolactam	NSV	--	--		NSV	--		--
Carbazole	NSV	--	--		NSV	--		--

Table B-3
Ecological Screening Values - Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Fresh Sediment Screening Value	Fresh Sediment Units	Reference	Comments	Fresh Sediment EqP Screening Value	Fresh Sediment EqP Units	TOC (%)	Reference
Chrysene	166	ug/kg	MacDonald et al. 2000a	TEC	NSV	--		--
Dibenz(a,h)anthracene	33.0	ug/kg	MacDonald et al. 2000a	TEC	NSV	--		--
Dibenzofuran	5,100	ug/kg	Buchman 2008	UET	2,000	ug/kg	1	USEPA 1996
Diethylphthalate	630	ug/kg	MacDonald et al. 2003	TEC	770	ug/kg	1	USEPA 2008
Dimethyl phthalate	NSV	--	--		NSV	--		--
Di-n-butylphthalate	110	ug/kg	Buchman 2008	UET	11,000	ug/kg	1	USEPA 1996
Di-n-octylphthalate	NSV	--	--		NSV	--		--
Fluoranthene	423	ug/kg	MacDonald et al. 2000a	TEC	2,900	ug/kg	1	USEPA 1996
Fluorene	77.4	ug/kg	MacDonald et al. 2000a	TEC	540	ug/kg	1	USEPA 1996
Hexachlorobenzene	20.0	ug/kg	Persuad et al. 1993	LEL	NSV	--		--
Hexachlorobutadiene	NSV	--	--		550	ug/kg	1	MacDonald et al. 2003
Hexachlorocyclopentadiene	NSV	--	--		NSV	--		--
Hexachloroethane	NSV	--	--		1,000	ug/kg	1	USEPA 1996
Indeno(1,2,3-cd)pyrene	200	ug/kg	Persuad et al. 1993	LEL	NSV	--		--
Isophorone	NSV	--	--		NSV	--		--
Naphthalene	176	ug/kg	MacDonald et al. 2000a	TEC	480	ug/kg	1	USEPA 1996
Nitrobenzene	NSV	--	--		1,779	ug/kg	1	NAVFAC 2007
n-Nitroso-di-n-propylamine	NSV	--	--		NSV	--		--
n-Nitrosodiphenylamine	NSV	--	--		2,684	ug/kg	1	USEPA 2006b
PAH (total)	3,553	ug/kg	Jones et al. 1997	ARCS TEC	NSV	--		--
PAH (HMW)	2,900	ug/kg	Jones et al. 1997	ARCS TEC	NSV	--		--
PAH (LMW)	786	ug/kg	Jones et al. 1997	ARCS TEC	NSV	--		--
Pentachlorophenol	NSV	--	--		504	ug/kg	1	USEPA 2006b
Phenanthrene	204	ug/kg	MacDonald et al. 2000a	TEC	850	ug/kg	1	USEPA 1996
Phenol	48.0	ug/kg	Buchman 2008	UET	31.0	ug/kg	1	Jones et al. 1997
Pyrene	195	ug/kg	MacDonald et al. 2000a	TEC	NSV	--		--
Volatile Organic Compounds								
1,1,1-Trichloroethane	NSV	--	--		170	ug/kg	1	USEPA 1996
1,1,2,2-Tetrachloroethane	NSV	--	--		940	ug/kg	1	USEPA 1996
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NSV	--	--		NSV	--		--

Table B-3 Ecological Screening Values - Sediment Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*								
	Fresh Sediment				Fresh Sediment EqP			
Chemical	Screening Value	Units	Reference	Comments	Screening Value	Units	TOC (%)	Reference
1,1,2-Trichloroethane	NSV	--	--		1,200	ug/kg	1	Jones et al. 1997
1,1-Dichloroethane	NSV	--	--		27.0	ug/kg	1	Jones et al. 1997
1,1-Dichloroethene	NSV	--	--		31.0	ug/kg	1	Jones et al. 1997
1,2,3-Trichlorobenzene	NSV	--	--		858	ug/kg	1	USEPA 2006b
1,2,4-Trichlorobenzene	NSV	--	--		9,200	ug/kg	1	USEPA 1996
1,2-Dibromo-3-chloropropane	NSV	--	--		NSV	--		--
1,2-Dibromoethane	NSV	--	--		NSV	--		--
1,2-Dichlorobenzene	NSV	--	--		340	ug/kg	1	USEPA 1996
1,2-Dichloroethane	NSV	--	--		250	ug/kg	1	Jones et al. 1997
1,2-Dichloropropane	NSV	--	--		NSV	--		--
1,3-Dichlorobenzene	NSV	--	--		1,700	ug/kg	1	USEPA 1996
1,4-Dichlorobenzene	NSV	--	--		350	ug/kg	1	USEPA 1996
2-Butanone	NSV	--	--		NSV	--		--
2-Hexanone	NSV	--	--		NSV	--		--
4-Methyl-2-pentanone	NSV	--	--		NSV	--		--
Acetone	NSV	--	--		NSV	--		--
Benzene	NSV	--	--		57.0	ug/kg	1	USEPA 1996
Bromochloromethane	NSV	--	--		NSV	--		--
Bromodichloromethane	NSV	--	--		NSV	--		--
Bromoform	NSV	--	--		650	ug/kg	1	USEPA 1996
Bromomethane	NSV	--	--		NSV	--		--
Carbon disulfide	NSV	--	--		0.85	ug/kg	1	Jones et al. 1997
Carbon tetrachloride	NSV	--	--		1,200	ug/kg	1	USEPA 1996
Chlorobenzene	NSV	--	--		820	ug/kg	1	USEPA 1996
Chloroethane	NSV	--	--		NSV	--		--
Chloroform	NSV	--	--		22.0	ug/kg	1	Jones et al. 1997
Chloromethane	NSV	--	--		NSV	--		--
cis-1,2-Dichloroethene	NSV	--	--		400	ug/kg	1	Jones et al. 1997
cis-1,3-Dichloropropene	NSV	--	--		0.051	ug/kg	1	Jones et al. 1997
Cumene (isopropylbenzene)	NSV	--	--		86.0	ug/kg	1	USEPA 2006b

Table B-3
Ecological Screening Values - Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Fresh Sediment Screening Value	Fresh Sediment Units	Reference	Comments	Fresh Sediment EqP Screening Value	Fresh Sediment EqP Units	Fresh Sediment EqP TOC (%)	Reference
Cyclohexane	NSV	--	--		NSV	--		--
Dibromochloromethane	NSV	--	--		NSV	--		--
Dichlorodifluoromethane(Freon-12)	NSV	--	--		NSV	--		--
Ethylbenzene	NSV	--	--		3,600	ug/kg	1	USEPA 1996
Methyl acetate	NSV	--	--		NSV	--		--
Methylcyclohexane	NSV	--	--		NSV	--		--
Methylene chloride	NSV	--	--		370	ug/kg	1	Jones et al. 1997
Methyl-tert-butyl ether (MTBE)	NSV	--	--		NSV	--		--
Styrene	NSV	--	--		559	ug/kg	1	USEPA 2006b
Tetrachloroethene	NSV	--	--		530	ug/kg	1	USEPA 1996
Toluene	NSV	--	--		670	ug/kg	1	USEPA 1996
trans-1,2-Dichloroethene	NSV	--	--		400	ug/kg	1	Jones et al. 1997
trans-1,3-Dichloropropene	NSV	--	--		0.051	ug/kg	1	Jones et al. 1997
Trichloroethene	NSV	--	--		1,600	ug/kg	1	USEPA 1996
Trichlorofluoromethane(Freon-11)	NSV	--	--		NSV	--		--
Vinyl chloride	NSV	--	--		NSV	--		--
Xylene, total	NSV	--	--		160	ug/kg	1	Jones et al. 1997

NSV - No Screening Value

Table B-4
Samples Used in the Ecological Risk Screening and Spatial Groupings
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Sample ID	Date	Depth (inches)	Site	Spatial Group
Surface Water					
CAS04-SW01	CAS04-SW01-1209	12/7/2009	Surface	Site 4	Upstream Pond
CAS04-SW02	CAS04-SW02-1209	12/7/2009	Surface	Site 4	Upstream Pond
CAS04-SW03	CAS04-SW03-1209	12/7/2009	Surface	Site 4	Upstream Pond
CAS04-SW04	CAS04-SW04-1209	12/7/2009	Surface	Site 4	Upstream Pond
CAS04-SW05	CAS04-SW05-1209	12/8/2009	Surface	Site 4	Stream
CAS04-SW06	CAS04-SW06-1209	12/8/2009	Surface	Site 4	Stream
CAS04-SW07	CAS04-SW07-1209	12/8/2009	Surface	Site 4	Stream
CAS04-SW07	CAS04-SW07P-1209	12/8/2009	Surface	Site 4	Stream
CAS04-SW08	CAS04-SW08-1209	12/8/2009	Surface	Site 4	Stream
CAS04-SW09	CAS04-SW09-1209	12/8/2009	Surface	Site 4	Stream
CAA03-SW01	CAA03-SW01-1209	12/7/2009	Surface	AOC 3	Upstream Pond
CAA03-SW01	CAA03-SW01P-1209	12/7/2009	Surface	AOC 3	Upstream Pond
CAA03-SW02	CAA03-SW02-1209	12/7/2009	Surface	AOC 3	Upstream Pond
CAA03-SW03	CAA03-SW03-1209	12/7/2009	Surface	AOC 3	Upstream Pond
CAA03-SW04	CAA03-SW04-1209	12/7/2009	Surface	AOC 3	Upstream Pond
Surface Sediment					
CAS004-4SD01	CAS004-4-SED01-00-1199	11/12/1999	0-4	Site 4	Upstream Pond
CAS004-4SD02	CAS004-4-SD02-00-1199	11/14/1999	0-4	Site 4	Upstream Pond
CAS004-4SD03	CAS004-4-SD03-00-1199	11/13/1999	0-4	Site 4	Upstream Pond
CAS004-4SD04	CAS004-4-SD04-00-1199	11/13/1999	0-4	Site 4	Upstream Pond
CAS004-4SD04	CAS004-4-SD04-00D-1199	11/13/1999	0-4	Site 4	Upstream Pond
CAS04-SD01	CAS04-SD01-1209A	12/9/2009	0-4	Site 4	Upstream Pond
CAS04-SD01	CAS04-SD01P-1209A	12/9/2009	0-4	Site 4	Upstream Pond
CAS04-SD02	CAS04-SD02-1209A	12/9/2009	0-4	Site 4	Upstream Pond
CAS04-SD03	CAS04-SD03-1209A	12/9/2009	0-4	Site 4	Upstream Pond
CAS04-SD04	CAS04-SD04-1209A	12/9/2009	0-4	Site 4	Upstream Pond
CAS04-SD05	CAS04-SD05-1209A	12/8/2009	0-4	Site 4	Stream
CAS04-SD06	CAS04-SD06-1209A	12/8/2009	0-4	Site 4	Stream
CAS04-SD07	CAS04-SD07-1209A	12/8/2009	0-4	Site 4	Stream
CAS04-SD07	CAS04-SD07P-1209A	12/8/2009	0-4	Site 4	Stream
CAS04-SD08	CAS04-SD08-1209A	12/8/2009	0-4	Site 4	Stream

Table B-4
Samples Used in the Ecological Risk Screening and Spatial Groupings
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Sample ID	Date	Depth (inches)	Site	Spatial Group
CAS04-SD09	CAS04-SD09-1209A	12/8/2009	0-4	Site 4	Stream
CAA03-SD01	CAA03-SD01-1209A	12/9/2009	0-4	AOC 3	Upstream Pond
CAA03-SD02	CAA03-SD02-1209A	12/9/2009	0-4	AOC 3	Upstream Pond
CAA03-SD03	CAA03-SD03-1209A	12/9/2009	0-4	AOC 3	Upstream Pond
CAA03-SD04	CAA03-SD04-1209A	12/9/2009	0-4	AOC 3	Upstream Pond
Subsurface Sediment					
CAS004-4SD01	CAS004-4-SED01-01-1199	11/12/1999	4-8	Site 4	Upstream Pond
CAS004-4SD02	CAS004-4-SD02-01-1199	11/14/1999	4-8	Site 4	Upstream Pond
CAS004-4SD03	CAS004-4-SD03-01-1199	11/13/1999	4-8	Site 4	Upstream Pond
CAS004-4SD04	CAS004-4-SD04-01-1199	11/13/1999	4-8	Site 4	Upstream Pond
CAS04-SD01	CAS04-SD01-1209B	12/9/2009	4-8	Site 4	Upstream Pond
CAS04-SD01	CAS04-SD01P-1209B	12/9/2009	4-8	Site 4	Upstream Pond
CAS04-SD02	CAS04-SD02-1209B	12/9/2009	4-8	Site 4	Upstream Pond
CAS04-SD03	CAS04-SD03-1209B	12/9/2009	4-8	Site 4	Upstream Pond
CAS04-SD04	CAS04-SD04-1209B	12/9/2009	4-8	Site 4	Upstream Pond
CAS04-SD05	CAS04-SD05-1209B	12/8/2009	4-8	Site 4	Stream
CAS04-SD06	CAS04-SD06-1209B	12/8/2009	4-8	Site 4	Stream
CAS04-SD07	CAS04-SD07-1209B	12/8/2009	4-8	Site 4	Stream
CAS04-SD07	CAS04-SD07P-1209B	12/8/2009	4-8	Site 4	Stream
CAS04-SD08	CAS04-SD08-1209B	12/8/2009	4-8	Site 4	Stream
CAS04-SD09	CAS04-SD09-1209B	12/8/2009	4-8	Site 4	Stream
CAA03-SD01	CAA03-SD01-1209B	12/9/2009	4-8	AOC 3	Upstream Pond
CAA03-SD02	CAA03-SD02-1209B	12/9/2009	4-8	AOC 3	Upstream Pond
CAA03-SD03	CAA03-SD03-1209B	12/9/2009	4-8	AOC 3	Upstream Pond
CAA03-SD04	CAA03-SD04-1209B	12/9/2009	4-8	AOC 3	Upstream Pond
Surface Soil					
CAS004-4HA01	CAS004-4HA01-00-1199	11/12/1999	0-6	Site 4	Site 4
CAS004-4HA02	CAS004-4HA02-00-1199	11/12/1999	0-6	Site 4	Site 4
CAS004-4HA02	CAS004-4HA02D-00-1199	11/12/1999	0-6	Site 4	Site 4
CAS004-4HA03	CAS004-4HA03-00-1199	11/12/1999	0-6	Site 4	Site 4
CAS004-4HA04	CAS004-4HA04-00-1199	11/12/1999	0-6	Site 4	Site 4
CAS004-4HA05	CAS004-4HA05-00-1199	11/12/1999	0-6	Site 4	Site 4

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Samples Used in the Ecological Risk Screening and Spatial Groupings
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Station ID	Sample ID	Date	Depth (inches)	Site	Spatial Group
CAS004-4HA06	CAS004-4HA06-00-1199	11/12/1999	0-6	Site 4	AOC 3
CAS04-SS01	CAS04-SS01-1109	11/3/2009	0-6	Site 4	Site 4
CAS04-SS02	CAS04-SS02-1109	11/3/2009	0-6	Site 4	Site 4
CAS04-SS03	CAS04-SS03-1109	11/3/2009	0-6	Site 4	Site 4
CAS04-SS04	CAS04-SS04-1109	11/3/2009	0-6	Site 4	Site 4
CAS04-SS05	CAS04-SS05-1109	11/3/2009	0-6	Site 4	Site 4
CAA03-SS01	CAA03-SS01-1109	11/3/2009	0-6	AOC 3	AOC 3
CAA03-SS02	CAA03-SS02-1109	11/4/2009	0-6	AOC 3	AOC 3
CAA03-SS03	CAA03-SS03-1109	11/4/2009	0-6	AOC 3	AOC 3
CAA03-SS04	CAA03-SS04-1109	11/4/2009	0-6	AOC 3	AOC 3
CAA03-SS05	CAA03-SS05-1109	11/4/2009	0-6	AOC 3	AOC 3
CAA03-SS06	CAA03-SS06-1109	11/4/2009	0-6	AOC 3	AOC 3
CAA03-SS07	CAA03-SS07-1109	11/5/2009	0-6	AOC 3	AOC 3
CAA03-SS08	CAA03-SS08-1109	11/5/2009	0-6	AOC 3	AOC 3
CAA03-SS08	CAA03-SS08P-1109	11/5/2009	0-6	AOC 3	AOC 3
CAA03-SS09	CAA03-SS09-1109	11/5/2009	0-6	AOC 3	AOC 3
CAA03-SS10	CAA03-SS10-1109	11/5/2009	0-6	AOC 3	AOC 3
CAS009-9S01	CAS009-9S01-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S02	CAS009-9S02-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S03	CAS009-9S03-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S04	CAS009-9S04-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S05	CAS009-9S05-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S06	CAS009-9S06-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S07	CAS009-9S07-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S08	CAS009-9S08-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S09	CAS009-9S09-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S10	CAS009-9S10-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S11	CAS009-9S11-00-1286	12/25/1986	"Surface"	Site 9	Site 9
CAS009-9S12	CAS009-9S12-00-1286	12/25/1986	"Surface"	Site 9	Site 9 Ditch
CAS009-9S13	CAS009-9S13-00-1286	12/25/1986	"Surface"	Site 9	Site 9 Ditch
CAS09-SS01	CAS09-SS01-1009	10/29/2009	0-6	Site 9	Site 9
CAS09-SS02	CAS09-SS02-1109	11/2/2009	0-6	Site 9	Site 9

Table B-4
Samples Used in the Ecological Risk Screening and Spatial Groupings
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Sample ID	Date	Depth (inches)	Site	Spatial Group
CAS09-SS03	CAS09-SS03-1109	11/2/2009	0-6	Site 9	Site 9
CAS09-SS04	CAS09-SS04-1109	11/2/2009	0-6	Site 9	Site 9
CAS09-SS05	CAS09-SS05-1109	11/2/2009	0-6	Site 9	Site 9
CAS09-SS05	CAS09-SS05P-1109	11/2/2009	0-6	Site 9	Site 9
CAS09-SD01	CAS09-SD01-1209A	12/9/2009	0-4	Site 9	Site 9 Ditch[1]
CAS09-SD02	CAS09-SD02-1209A	12/9/2009	0-4	Site 9	Site 9 Ditch[1]
CAS09-SD03	CAS09-SD03-1209A	12/9/2009	0-4	Site 9	Site 9 Ditch[1]
Subsurface Soil					
CAS004-4HA02	CAS004-4-HA02-02-1199	11/12/1999	12-24	Site 4	Site 4
CAS004-4HA03	CAS004-4-HA03-02-1199	11/12/1999	12-24	Site 4	Site 4
CAS004-4HA04	CAS004-4-HA04-01-1199	11/12/1999	6-12	Site 4	Site 4
CAS004-4HA05	CAS004-4-HA05-01-1199	11/12/1999	6-12	Site 4	Site 4
CAS004-4HA06	CAS004-4-HA06-02-1199	11/12/1999	12-24	Site 4	AOC 3
CAS04-SB01	CAS04-SB01-1109	11/3/2009	6-24	Site 4	Site 4
CAS04-SB02	CAS04-SB02-1109	11/3/2009	6-24	Site 4	Site 4
CAS04-SB03	CAS04-SB03-1109	11/3/2009	6-24	Site 4	Site 4
CAS04-SB04	CAS04-SB04-1109	11/3/2009	6-24	Site 4	Site 4
CAS04-SB05	CAS04-SB05-1109	11/3/2009	6-24	Site 4	Site 4
CAA03-SB01	CAA03-SB01-1109	11/3/2009	6-24	AOC 3	AOC 3
CAA03-SB02	CAA03-SB02-1109A	11/4/2009	6-24	AOC 3	AOC 3
CAA03-SB03	CAA03-SB03-1109A	11/4/2009	6-24	AOC 3	AOC 3
CAA03-SB04	CAA03-SB04-1109A	11/4/2009	6-24	AOC 3	AOC 3
CAA03-SB05	CAA03-SB05-1109A	11/4/2009	6-24	AOC 3	AOC 3
CAA03-SB06	CAA03-SB06-1109	11/4/2009	6-24	AOC 3	AOC 3
CAA03-SB07	CAA03-SB07-1109	11/5/2009	6-24	AOC 3	AOC 3
CAA03-SB08	CAA03-SB08-1109	11/5/2009	6-24	AOC 3	AOC 3
CAA03-SB08	CAA03-SB08P-1109	11/5/2009	6-24	AOC 3	AOC 3
CAA03-SB09	CAA03-SB09-1109	11/5/2009	6-24	AOC 3	AOC 3
CAA03-SB10	CAA03-SB10-1109	11/5/2009	6-24	AOC 3	AOC 3
CAS09-SB01	CAS09-SB01-1009	10/29/2009	6-24	Site 9	Site 9
CAS09-SB02	CAS09-SB02-1109	11/2/2009	6-24	Site 9	Site 9

Table B-4
Samples Used in the Ecological Risk Screening and Spatial Groupings
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Sample ID	Date	Depth (inches)	Site	Spatial Group
CAS09-SB03	CAS09-SB03-1109	11/2/2009	6-24	Site 9	Site 9
CAS09-SB04	CAS09-SB04-1109	11/2/2009	6-24	Site 9	Site 9
CAS09-SB05	CAS09-SB05-1109	11/2/2009	6-24	Site 9	Site 9
CAS09-SB05	CAS09-SB05P-1109	11/2/2009	6-24	Site 9	Site 9
CAS09-SD01	CAS09-SD01-1209B	12/9/2009	4-8	Site 9	Site 9 Ditch[1]
CAS09-SD02	CAS09-SD02-1209B	12/9/2009	4-8	Site 9	Site 9 Ditch[1]
CAS09-SD03	CAS09-SD03-1209B	12/9/2009	4-8	Site 9	Site 9 Ditch[1]

Shaded cells indicate field duplicates
1 - Sample collected as "sediment" but evaluated as soil

Table B-4a
Uncertainty Factors
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Convert From	Convert To	Uncertainty Factor
Chronic NOAEL or NOEC	Chronic NOAEL or NOEC	1
Chronic LOAEL or LOEC	Chronic NOAEL or NOEC	5
Subchronic NOAEL or NOEC	Chronic NOAEL or NOEC	10
Subchronic LOAEL or LOEC	Chronic NOAEL or NOEC	20
Acute NOAEL or NOEC	Chronic NOAEL or NOEC	30
Acute LOAEL or LOEC	Chronic NOAEL or NOEC	50
LD50 or LC50	Chronic NOAEL or NOEC	100

Uncertainty factors from Wentsel et al. (1996)
Durations are defined as follows (USEPA 1999; Sample et al. 1996):
- Acute: <3 days (plants, invertebrates) and <14 days (fish, birds, mammals)
- Subchronic: 3 - 6 days (plants, invertebrates) and 14 - 90 days (fish, birds, mammals)
- Chronic: >7 days (plants, invertebrates) and >90 days or during critical life stage (fish, birds, mammals)

Table B-5
Ecological Screening Statistics - Site 4 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
Acetone	5.00 - 78.0	3 / 9	94.0	120	CAS04-SS05-1109	45.6	46.6	74.5	21.8	NSV	-- / --	NSV	--	-- / --	--	**YES**	--	--	**NO[3]**
Styrene	5.00 - 14.8	2 / 9	2.00	2.00	CAS04-SS02-1109	4.22	2.14	5.55	3.75	64,000	0 / 9	0.00003	--	-- / --	--	NO	--	--	NO
Toluene	5.00 - 14.8	1 / 9	2.00	2.00	CAS04-SS04-1109	4.34	2.03	5.59	3.92	40,000	0 / 9	0.0001	--	-- / --	--	NO	--	--	NO
Xylene, total	11.2 - 18.0	1 / 9	2.00	2.00	CAS004-4HA02-00-1199	7.15	2.33	8.59	6.60	1,300	0 / 9	0.002	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
Acenaphthene	21.0 - 5,500	1 / 10	330	330	CAS004-4HA02-00-1199	483	889	998	77.9	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Anthracene	380 - 5,500	6 / 10	1.70	530	CAS004-4HA02-00-1199	498	890	1,014	39.3	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)anthracene	380 - 2,600	7 / 10	10.0	1,100	CAS004-4HA02-00-1199	397	539	709	93.2	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)pyrene	380 - 2,600	7 / 10	4.40	2,300	CAS004-4HA05-00-1199	498	780	950	70.4	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(b)fluoranthene	380 - 380	9 / 10	10.0	1,700	CAS004-4HA05-00-1199	349	581	686	82.7	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(g,h,i)perylene	21.0 - 2,600	4 / 10	2.50	1,200	CAS004-4HA05-00-1199	345	517	644	58.0	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(k)fluoranthene	22.0 - 380	7 / 10	3.70	1,700	CAS004-4HA05-00-1199	307	546	624	48.3	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
bis(2-Ethylhexyl)phthalate	49.0 - 16,000	1 / 10	66.0	66.0	CAS04-SS05-1109	1,661	2,872	3,326	197	30,000	0 / 10	0.002	--	-- / --	--	NO	--	--	NO
Carbazole	22.0 - 5,500	5 / 10	2.10	250	CAS004-4HA02-00-1199	471	893	989	44.1	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO[3]**
Chrysene	22.0 - 380	7 / 10	4.00	2,200	CAS004-4HA05-00-1199	422	742	852	59.5	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Dibenz(a,h)anthracene	22.0 - 5,500	2 / 10	10.0	13.0	CAS04-SS02-1109	555	904	1,079	87.3	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluoranthene	380 - 380	9 / 10	14.0	2,700	CAS004-4HA02-00-1199	537	940	1,081	102	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluorene	21.0 - 5,500	1 / 10	250	250	CAS004-4HA02-00-1199	475	891	991	75.7	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	23.0 - 2,600	7 / 10	9.80	1,300	CAS004-4HA05-00-1199	351	532	659	73.3	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
PAH (HMW)	1,710 - 1,710	9 / 10	88.8	17,250	CAS004-4HA05-00-1199	3,742	5,960	7,197	655	18,000	0 / 10	0.96	--	-- / --	--	NO	--	--	NO
PAH (LMW)	1,710 - 1,710	9 / 10	92.5	22,450	CAS004-4HA05-00-1199	4,681	7,570	9,070	740	29,000	0 / 10	0.77	--	-- / --	--	NO	--	--	NO
Phenanthrene	380 - 2,600	7 / 10	7.70	2,400	CAS004-4HA02-00-1199	556	843	1,045	94.0	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pyrene	380 - 380	9 / 10	6.90	3,000	CAS004-4HA05-00-1199	604	1,099	1,241	76.0	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDE	0.67 - 27.0	4 / 10	0.90	43.0	CAS004-4HA04-00-1199	7.48	13.2	15.2	2.37	114	0 / 10	0.38	--	-- / --	--	NO	--	--	NO
4,4'-DDT	1.30 - 4.10	4 / 10	1.70	220	CAS004-4HA05-00-1199	24.8	68.7	64.6	3.45	100	1 / 10	2.20	--	-- / --	--	**YES**	0.65	0.25	NO
Aldrin	1.80 - 2.70	1 / 10	33.0	33.0	CAS004-4HA05-00-1199	4.23	10.1	10.1	1.45	3.63	1 / 10	9.09	--	-- / --	--	**YES**	2.78	1.17	**YES**
alpha-Chlordane	1.90 - 14.0	1 / 10	0.54	0.54	CAS04-SS04-1109	1.59	1.91	2.70	1.18	11.0	0 / 10	0.05	--	-- / --	--	NO	--	--	NO
Aroclor-1242	19.0 - 52.0	1 / 10	1,000	1,000	CAS004-4HA05-00-1199	114	311	294	21.6	8,000	0 / 10	0.13	--	-- / --	--	NO	--	--	NO
Aroclor-1260	20.0 - 20.0	8 / 10	19.0	2,700	CAS004-4HA05-00-1199	359	842	847	61.3	8,000	0 / 10	0.34	--	-- / --	--	NO	--	--	NO
Endosulfan II	3.50 - 27.0	2 / 10	4.40	5.70	CAS004-4HA03-00-1199	3.77	3.66	5.89	2.91	6.32	0 / 10	0.90	--	-- / --	--	NO	--	--	NO
Endrin	3.50 - 5.20	3 / 10	3.50	28.0	CAS004-4HA05-00-1199	5.20	8.13	9.91	3.10	1.95	3 / 10	14.4	--	-- / --	--	**YES**	5.08	2.67	**YES**
Endrin aldehyde	3.70 - 5.20	4 / 10	1.00	77.0	CAS004-4HA05-00-1199	9.45	23.7	23.2	2.74	1.95	2 / 10	39.5	--	-- / --	--	**YES**	11.9	4.85	**YES**
Endrin ketone	3.50 - 5.20	2 / 10	4.50	87.0	CAS004-4HA05-00-1199	10.7	26.8	26.3	3.13	1.95	2 / 10	44.6	--	-- / --	--	**YES**	13.5	5.51	**YES**
gamma-Chlordane	1.80 - 2.70	1 / 10	15.0	15.0	CAS004-4HA05-00-1199	2.43	4.42	4.99	1.34	11.0	1 / 10	1.36	--	-- / --	--	**YES**	0.45	0.22	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	10 / 10	4,560	29,400	CAS04-SS02-1109	9,861	7,898	14,439	8,099	pH < 5.5	8 / 10	--	12,200	2 / 10	2.41	**YES**	mean pH < 5.5		**YES**
Antimony	0.47 - 12.6	6 / 10	0.080	0.67	CAS004-4HA04-00-1199	0.83	1.93	1.95	0.25	78.0	0 / 10	0.01	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	10 / 10	1.10	6.40	CAS04-SS02-1109	3.03	1.55	3.93	2.68	18.0	0 / 10	0.36	--	-- / --	--	NO	--	--	NO
Barium	-- - --	10 / 10	14.8	164	CAS004-4HA04-00-1199	42.6	45.3	68.8	31.5	330	0 / 10	0.50	--	-- / --	--	NO	--	--	NO
Beryllium	0.33 - 0.68	5 / 10	0.22	0.76	CAS04-SS02-1109	0.34	0.18	0.44	0.31	40.0	0 / 10	0.02	--	-- / --	--	NO	--	--	NO
Cadmium	0.070 - 1.20	2 / 10	0.74	3.30	CAS004-4HA05-00-1199	0.66	0.96	1.21	0.28	32.0	0 / 10	0.10	--	-- / --	--	NO	--	--	NO
Calcium [2]	-- - --	10 / 10	137	8,420	CAS004-4HA03-00-1199	2,922	3,340	4,858	1,156	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	10 / 10	6.90	45.2	CAS04-SS02-1109	16.2	11.9	23.1	13.4	64.0	0 / 10	0.71	--	-- / --	--	NO	--	--	NO
Cobalt	1.40 - 1.40	9 / 10	1.10	4.60	CAS004-4HA05-00-1199	2.50	1.38	3.30	2.12	13.0	0 / 10	0.35	--	-- / --	--	NO	--	--	NO
Copper	3.80 - 4.50	8 / 10	1.80	150	CAS004-4HA05-00-1199	20.6	46.1	47.3	5.58	70.0	1 / 10	2.14	4.25	4 / 10	35.3	**YES**	0.68	0.29	NO
Cyanide	0.020 - 0.84	2 / 10	0.11	0.13	CAS004-4HA02-00-1199	0.22	0.18	0.32	0.11	15.8	0 / 10	0.01	--	-- / --	--	NO	--	--	NO

Table B-5
Ecological Screening Statistics - Site 4 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Iron	-- - --	10 / 10	4,370	28,300	CAS04-SS02-1109	11,752	6,878	15,739	10,290	5 < pH > 8	1 / 10	--	19,900	1 / 10	1.42	**YES**	mean pH in range		NO
Lead	-- - --	10 / 10	7.90	129	CAS004-4HA05-00-1199	28.3	36.7	49.5	18.6	120	1 / 10	1.08	17.4	4 / 10	7.41	**YES**	0.41	0.24	NO
Magnesium [2]	-- - --	10 / 10	351	2,280	CAS04-SS02-1109	997	666	1,384	830	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Manganese	-- - --	10 / 10	24.7	233	CAS004-4HA02-00-1199	82.5	75.1	126	58.9	220	1 / 10	1.06	324	0 / 10	0.72	NO	--	--	NO
Mercury	-- - --	10 / 10	0.010	0.88	CAS004-4HA05-00-1199	0.23	0.33	0.42	0.074	0.10	3 / 10	8.80	0.111	3 / 10	7.93	**YES**	4.17	2.25	**YES**
Nickel	2.20 - 4.10	7 / 10	2.20	12.1	CAS004-4HA05-00-1199	4.87	3.91	7.13	3.63	38.0	0 / 10	0.32	--	-- / --	--	NO	--	--	NO
Potassium [2]	-- - --	10 / 10	280	2,580	CAS04-SS02-1109	908	705	1,317	711	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	0.64 - 0.81	6 / 10	0.18	1.00	CAS004-4HA04-00-1199	0.37	0.23	0.50	0.33	0.52	1 / 10	1.92	0.51	1 / 10	1.96	**YES**	0.97	0.71	NO
Sodium [2]	23.1 - 73.8	5 / 10	14.4	49.6	CAS04-SS02-1109	26.1	13.3	33.8	23.0	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Vanadium	-- - --	10 / 10	9.80	63.6	CAS04-SS02-1109	23.2	16.9	33.0	19.4	130	0 / 10	0.49	--	-- / --	--	NO	--	--	NO
Zinc	28.6 - 32.5	8 / 10	10.4	324	CAS004-4HA05-00-1199	82.1	118	151	34.7	120	2 / 10	2.70	26.5	4 / 10	12.2	**YES**	1.25	0.68	NO
Other Parameters																			
pH --	- --	5 / 5	4.60	6.00	CAS04-SS02-1109	5.26	0.53	5.76	5.24	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	5 / 5	5,600	18,000	CAS04-SS05-1109	14,720	5,147	19,627	13,605	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-6
Exceedances - Site 4 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Soil Screening Value	95% UTL	CAS004-4HA01	CAS004-4HA02		CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SS01	CAS04-SS02
Sample ID			CAS004-4HA01-00-1199	CAS004-4HA02-00-1199	CAS004-4HA02D-00-1199	CAS004-4HA03-00-1199	CAS004-4HA04-00-1199	CAS004-4HA05-00-1199	CAS04-SS01-1109	CAS04-SS02-1109
Sample Date			11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09
Volatile Organic Compounds (UG/KG)										
Acetone	--	--	5 B	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	70 B	**100**
Styrene	64,000	--	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	5 U	**2 J**
Toluene	40,000	--	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	5 U	6 U
Xylene, total	1,300	--	11.2 U	**2 J**	11.9 U	11.6 U	14.8 UL	14.8 R	16 U	18 U
Semivolatile Organic Compounds (UG/KG)										
Acenaphthene	LMW PAH	--	380 U	**330 J**	2,100 U	400 U	2,600 U	5,500 U	21 U	25 U
Anthracene	LMW PAH	--	380 U	**530 J**	2,100 U	400 U	2,600 U	5,500 U	**4 J**	**4.2 J**
Benzo(a)anthracene	HMW PAH	--	380 U	**1,100 J**	**290 J**	400 U	2,600 U	**1,100 J**	**16 J**	**23 J**
Benzo(a)pyrene	HMW PAH	--	380 U	**950 J**	**440 J**	400 U	2,600 U	**2,300 J**	**7.8 J**	**14 J**
Benzo(b)fluoranthene	HMW PAH	--	380 U	**1,100 J**	**320 J**	**76 J**	**330 J**	**1,700 J**	**18 J**	**29**
Benzo(g,h,i)perylene	HMW PAH	--	380 U	**650 J**	**340 J**	**61 J**	2,600 U	**1,200 J**	21 UL	**2.5 L**
Benzo(k)fluoranthene	HMW PAH	--	380 U	**770 J**	**470 J**	**53 J**	**320 J**	**1,700 J**	**3.7 J**	**6.3 J**
bis(2-Ethylhexyl)phthalate	30,000	--	49 B	16,000 B	3,000 B	100 B	11,000 B	5,500 U	100 U	120 U
Carbazole	--	--	380 U	**250 J**	2,100 U	400 U	2,600 U	5,500 U	**2.6 J**	**3.8 J**
Chrysene	HMW PAH	--	380 U	**1,300 J**	**520 J**	**75 J**	**410 J**	**2,200 J**	**4 J**	**8.6 J**
Dibenz(a,h)anthracene	HMW PAH	--	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	**10 J**	**13 J**
Fluoranthene	LMW PAH	--	380 U	**2,700**	**660 J**	**49 J**	**510 J**	**1,800 J**	**21**	**36**
Fluorene	LMW PAH	--	380 U	**250 J**	2,100 U	400 U	2,600 U	5,500 U	21 U	25 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	380 U	**600 J**	**250 J**	**48 J**	2,600 U	**1,300 J**	**12 K**	**18 K**
PAH (HMW)	18,000	--	1,710 U	**9,820**	**4,480**	**959**	**8,000**	**17,250**	**96**	**135**
PAH (LMW)	29,000	--	1,710 U	**10,410**	**8,570**	**1,649**	**10,910**	**22,450**	**104**	**136**
Phenanthrene	LMW PAH	--	380 U	**2,400**	**560 J**	400 U	2,600 U	**1,400 J**	**16 J**	**21 J**
Pyrene	HMW PAH	--	380 U	**2,300**	**800 J**	**46 J**	**440 J**	**3,000 J**	**14 J**	**21 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDE	114	--	3.8 U	**9.6 J**	4.2 U	4 U	**43 J**	27 U	0.67 B	4.1 U
4,4'-DDT	100	--	3.8 U	**7 J**	**4.6 J**	4 U	**9.4**	**220 K**	1.3 B	4.1 U
Aldrin	3.63	--	2 U	2.1 U	2.2 U	2.1 U	2.7 U	**33 K**	1.9 UJ	2.1 U
alpha-Chlordane	11.0	--	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	1.9 UJ	2.1 U
Aroclor-1242	8,000	--	38 U	42 U	42 U	40 U	52 U	**1,000 K**	20 U	22 U
Aroclor-1260	8,000	--	**53**	**64 J**	**75 J**	**53 J**	**600 J**	**2,700 K**	20 U	**35**
Endosulfan II	6.32	--	**4.4 J**	4.2 U	4.2 U	**5.7 J**	5.2 U	27 U	3.7 UJ	4.1 U
Endrin	1.95	--	**6.3 J**	4.2 U	4.2 U	4 U	5.2 U	**28 K**	3.7 UJ	4.1 U
Endrin aldehyde	1.95	--	3.8 U	4.2 U	4.2 U	4 U	5.2 U	**77 K**	3.7 UJ	4.1 U
Endrin ketone	1.95	--	3.8 U	4.2 U	**4.5**	4 U	5.2 U	**87 K**	3.7 UJ	4.1 U
gamma-Chlordane	11.0	--	2 U	2.1 U	2.2 U	2.1 U	2.7 U	**15 K**	1.9 UJ	2.1 U
Explosives (UG/KG)										
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)										
Aluminum	pH < 5.5	12,200	**4,560 L**	**5,810 L**	**7,160 L**	**6,760 L**	**9,560 L**	**6,260 L**	**6,360**	**29,400**
Antimony	78.0	11.0	0.49 U	0.46 U	0.55 U	0.47 U	**0.67 J**	12.6 B	**0.08 L**	**0.2 L**
Arsenic	18.0	6.36	**2.9 L**	**2.7 L**	**2.6 L**	**3 L**	**4.1 L**	**3.5 L**	**1.6**	**6.4**
Barium	330	52.9	**20.3 J**	**36.6 J**	**27.1 J**	**25.5 J**	**164**	**68**	**17.6**	**32.1**
Beryllium	40.0	0.587	0.33 B	0.64 B	0.36 B	0.35 B	0.68 B	0.65 B	**0.24 J**	**0.76**
Cadmium	32.0	1.50	0.08 U	0.07 U	0.08 U	0.07 U	**0.74 J**	**3.3**	0.91 U	1.2 U
Chromium	64.0	18.2	**9.4**	**8.7**	**9.6**	**11.8**	**16.9**	**19**	**9.2 K**	**45.2 K**
Cobalt	13.0	9.93	1.4 U	**2.8 J**	**3.7 J**	**1.7 J**	**4.1 J**	**4.6 J**	**1.2**	**3.5**
Copper	70.0	4.25	4.5 B	**10.5**	**12**	3.8 B	**26**	**150**	**1.8 K**	**4.4 K**
Cyanide	15.8	--	0.02 UL	**0.12 L**	**0.13 L**	0.02 UL	0.03 UL	**0.11 L**	0.77 U	0.84 U
Iron	5 < pH > 8	19,900	**8,900 L**	**9,840 L**	**8,570 L**	**8,910 L**	**14,600 L**	**14,300 L**	**7,090**	**28,300**
Lead	120	17.4	**12.8**	**22.7**	**24**	**11.6**	**39.5**	**129**	**7.9 K**	**12.6 K**
Manganese	220	324	**48.7**	**233**	**127**	**43.2**	**151**	**175**	**27.7 K**	**33.6 K**

Table B-6
Exceedances - Site 4 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS004-4HA01	CAS004-4HA02		CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SS01	CAS04-SS02
Sample ID			CAS004-4HA01-00-1199	CAS004-4HA02-00-1199	CAS004-4HA02D-00-1199	CAS004-4HA03-00-1199	CAS004-4HA04-00-1199	CAS004-4HA05-00-1199	CAS04-SS01-1109	CAS04-SS02-1109
Sample Date			11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09
Mercury	0.10	0.111	**0.04 J**	**0.31**	**0.36**	**0.09 J**	**0.76**	**0.88**	**0.01 J**	**0.03 J**
Nickel	38.0	9.52	2.2 B	3.8 B	4.1 B	4 B	**10.1 J**	**12.1**	**2.3 J**	**8.1 J**
Selenium	0.52	0.51	0.67 U	0.63 U	0.75 U	0.64 U	**1 J**	0.81 U	**0.22 J**	**0.27 J**
Vanadium	130	27.9	**13.9**	**13.9**	**15.1**	**16.6**	**22.2**	**23.5**	**13.3**	**63.6**
Zinc	120	26.5	28.6 B	**106**	**102**	32.5 B	**273**	**324**	**13 K**	**28.8 K**
Other Parameters										
pH	--	--	NA	NA	NA	NA	NA	NA	**5**	**6**
Total organic carbon (TOC) (MG/KG)	--	--	NA	NA	NA	NA	NA	NA	**5,600**	**16,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

Table B-6
Exceedances - Site 4 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID / **Sample ID** / **Sample Date**	**Soil Screening Value**	**95% UTL**	CAS04-SS03 / CAS04-SS03-1109 / 11/03/09	CAS04-SS04 / CAS04-SS04-1109 / 11/03/09	CAS04-SS05 / CAS04-SS05-1109 / 11/03/09
Volatile Organic Compounds (UG/KG)					
Acetone	--	--	78 B	**94 J**	**120 J**
Styrene	64,000	--	**2 J**	6 UJ	6 UJ
Toluene	40,000	--	6 UJ	**2 J**	6 UJ
Xylene, total	1,300	--	17 UJ	18 UJ	18 UJ
Semivolatile Organic Compounds (UG/KG)					
Acenaphthene	LMW PAH	--	22 U	22 U	23 U
Anthracene	LMW PAH	--	**1.7 J**	**2.4 J**	**1.8 J**
Benzo(a)anthracene	HMW PAH	--	**14 J**	**16 J**	**10 J**
Benzo(a)pyrene	HMW PAH	--	**5.8 J**	**10 J**	**4.4 J**
Benzo(b)fluoranthene	HMW PAH	--	**16 J**	**20 J**	**10 J**
Benzo(g,h,i)perylene	HMW PAH	--	22 UL	22 UL	23 UL
Benzo(k)fluoranthene	HMW PAH	--	22 U	**5.5 J**	23 U
bis(2-Ethylhexyl)phthalate	30,000	--	110 U	110 U	**66 J**
Carbazole	--	--	22 U	**3.6 J**	**2.1 J**
Chrysene	HMW PAH	--	22 U	**7.7 J**	23 U
Dibenz(a,h)anthracene	HMW PAH	--	22 U	22 U	23 U
Fluoranthene	LMW PAH	--	**17 J**	**29**	**14 J**
Fluorene	LMW PAH	--	22 U	22 U	23 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	**9.8 K**	**20 J**	23 U
PAH (HMW)	18,000	--	**96.6**	**118**	**88.8**
PAH (LMW)	29,000	--	**93.1**	**112**	**92.5**
Phenanthrene	LMW PAH	--	**8.4 J**	**15 J**	**7.7 J**
Pyrene	HMW PAH	--	**7 J**	**17 J**	**6.9 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)					
4,4'-DDE	114	--	0.72 B	**1.2 L**	**0.9 L**
4,4'-DDT	100	--	2.2 B	3.5 U	**1.7 J**
Aldrin	3.63	--	1.9 U	1.8 U	1.9 U
alpha-Chlordane	11.0	--	1.9 U	**0.54 J**	1.9 U
Aroclor-1242	8,000	--	20 U	19 U	20 U
Aroclor-1260	8,000	--	20 U	**33**	**19 J**
Endosulfan II	6.32	--	3.8 U	3.5 U	3.7 U
Endrin	1.95	--	**3.5 J**	3.5 U	3.7 U
Endrin aldehyde	1.95	--	**1.9 J**	**2.1 J**	**1 J**
Endrin ketone	1.95	--	3.8 U	3.5 U	3.7 U
gamma-Chlordane	11.0	--	1.9 U	1.8 U	1.9 U
Explosives (UG/KG)					
No Detections	--	--	NA	NA	NA
Inorganics (MG/KG)					
Aluminum	pH < 5.5	12,200	**4,560**	**5,990**	**18,000**
Antimony	78.0	11.0	**0.09 L**	**0.08 L**	**0.14 L**
Arsenic	18.0	6.36	**1.4**	**1.1**	**3.6**
Barium	330	52.9	**14.8**	**24.8 J**	**22.2 J**
Beryllium	40.0	0.587	**0.22 J**	**0.46 J**	**0.42**
Cadmium	32.0	1.50	0.98 U	0.96 U	0.77 U
Chromium	64.0	18.2	**7.3 K**	**6.9**	**26.6**
Cobalt	13.0	9.93	**1.1**	**2.1**	**2.3**
Copper	70.0	4.25	**2.4 K**	**2.5**	**3.1**
Cyanide	15.8	--	0.7 U	0.77 U	0.77 U
Iron	5 < pH > 8	19,900	**6,210**	**4,370 J**	**15,000 J**
Lead	120	17.4	**11.7 K**	**10**	**23.7**
Manganese	220	324	**28.8 K**	**59 J**	**24.7 J**

Table B-6
Exceedances - Site 4 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS04-SS03	CAS04-SS04	CAS04-SS05
Sample ID			CAS04-SS03-1109	CAS04-SS04-1109	CAS04-SS05-1109
Sample Date			11/03/09	11/03/09	11/03/09
Mercury	0.10	0.111	**0.02 J**	**0.03 J**	**0.03 J**
Nickel	38.0	9.52	**2.2 J**	**3.1 J**	**5.6**
Selenium	0.52	0.51	**0.18 J**	**0.28 J**	**0.32 J**
Vanadium	130	27.9	**11.9**	**9.8**	**41.7**
Zinc	120	26.5	**10.4 K**	**14.9**	**20.3**
Other Parameters					
pH	--	--	**5.2**	**5.5**	**4.6**
Total organic carbon (TOC) (MG/KG)	--	--	**17,000**	**17,000**	**18,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

Table B-7
Ecological Screening Statistics - Site 4 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
2-Butanone	13.0 - 28.0	1 / 9	8.00	8.00	CAS004-4-HA02-02-1199	11.1	3.19	13.1	10.7	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO[3]**
Acetone	13.0 - 76.0	2 / 9	98.0	120	CAS04-SB04-1109	40.1	41.1	65.6	25.0	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO[3]**
Chloroform	6.00 - 20.4	1 / 9	1.00	1.00	CAS04-SB04-1109	4.96	2.87	6.74	4.14	1,844	0 / 9	0.001	--	-- / --	--	NO	--	--	NO
Ethylbenzene	5.00 - 20.4	1 / 9	2.00	2.00	CAS004-4-HA02-02-1199	4.37	2.87	6.15	3.71	1,815	0 / 9	0.001	--	-- / --	--	NO	--	--	NO
Methylene chloride	7.00 - 28.0	1 / 9	12.0	12.0	CAS04-SB04-1109	10.2	4.08	12.7	9.25	1,250	0 / 9	0.01	--	-- / --	--	NO	--	--	NO
Tetrachloroethene	5.00 - 20.4	1 / 9	3.00	3.00	CAS004-4-HA03-02-1199	4.45	2.76	6.16	3.87	179	0 / 9	0.02	--	-- / --	--	NO	--	--	NO
Toluene	5.00 - 20.4	1 / 9	2.00	2.00	CAS04-SB04-1109	4.85	2.88	6.64	4.15	40,000	0 / 9	0.0001	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
Benzo(a)anthracene	21.0 - 17,000	5 / 9	6.20	77.0	CAS004-4-HA02-02-1199	1,807	3,117	3,739	83.3	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)pyrene	20.0 - 17,000	2 / 9	110	550	CAS004-4-HA05-01-1199	1,635	3,138	3,580	91.5	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(b)fluoranthene	20.0 - 17,000	2 / 9	130	510	CAS004-4-HA05-01-1199	1,633	3,138	3,578	92.5	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(g,h,i)perylene	20.0 - 17,000	1 / 9	79.0	79.0	CAS004-4-HA02-02-1199	1,809	3,116	3,741	103	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(k)fluoranthene	20.0 - 17,000	2 / 9	64.0	490	CAS004-4-HA05-01-1199	1,623	3,143	3,571	85.1	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
bis(2-Ethylhexyl)phthalate	100 - 4,300	1 / 9	63,000	63,000	CAS004-4-HA03-02-1199	7,452	20,844	20,372	317	30,000	1 / 9	2.10	--	-- / --	--	**YES**	0.68	0.25	NO
Chrysene	20.0 - 17,000	1 / 9	130	130	CAS004-4-HA02-02-1199	1,815	3,112	3,744	109	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Di-n-butylphthalate	66.0 - 5,700	1 / 9	90,000	90,000	CAS004-4-HA04-01-1199	10,590	29,798	29,061	278	40,000	1 / 9	2.25	--	-- / --	--	**YES**	0.73	0.26	NO
Fluoranthene	20.0 - 17,000	2 / 9	160	880	CAS004-4-HA05-01-1199	1,677	3,122	3,612	101	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	20.0 - 17,000	1 / 9	66.0	66.0	CAS004-4-HA02-02-1199	1,808	3,117	3,740	101	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
PAH (HMW)	94.5 - 76,500	6 / 9	87.3	13,230	CAS004-4-HA05-01-1199	8,641	14,053	17,352	725	18,000	0 / 9	0.74	--	-- / --	--	NO	--	--	NO
PAH (LMW)	90.0 - 76,500	2 / 9	1,940	18,080	CAS004-4-HA05-01-1199	9,252	14,300	18,116	598	29,000	0 / 9	0.62	--	-- / --	--	NO	--	--	NO
Phenanthrene	20.0 - 17,000	1 / 9	100	100	CAS004-4-HA02-02-1199	1,812	3,114	3,742	105	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pyrene	20.0 - 17,000	2 / 9	210	930	CAS004-4-HA05-01-1199	1,688	3,118	3,621	104	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDD	3.30 - 6.70	1 / 9	4.50	4.50	CAS004-4-HA02-02-1199	2.33	0.97	2.94	2.19	583	0 / 9	0.01	--	-- / --	--	NO	--	--	NO
4,4'-DDE	3.30 - 4.60	3 / 9	5.30	24.0	CAS004-4-HA04-01-1199	5.59	7.45	10.2	3.30	114	0 / 9	0.21	--	-- / --	--	NO	--	--	NO
4,4'-DDT	3.30 - 4.60	3 / 9	5.80	150	CAS004-4-HA05-01-1199	20.0	48.9	50.3	4.21	100	1 / 9	1.50	--	-- / --	--	**YES**	0.50	0.20	NO
Aldrin	1.70 - 3.40	1 / 9	27.0	27.0	CAS004-4-HA05-01-1199	3.97	8.64	9.32	1.52	3.63	1 / 9	7.44	--	-- / --	--	**YES**	2.57	1.09	**YES**
alpha-Chlordane	1.70 - 3.40	1 / 9	2.40	2.40	CAS004-4-HA05-01-1199	1.23	0.51	1.55	1.16	11.0	0 / 9	0.22	--	-- / --	--	NO	--	--	NO
Aroclor-1242	18.0 - 67.0	1 / 9	2,300	2,300	CAS004-4-HA05-01-1199	270	761	742	24.6	8,000	0 / 9	0.29	--	-- / --	--	NO	--	--	NO
Aroclor-1260	18.0 - 48.0	3 / 9	51.0	1,600	CAS004-4-HA05-01-1199	228	525	553	33.2	8,000	0 / 9	0.20	--	-- / --	--	NO	--	--	NO
Endosulfan II	3.30 - 6.70	1 / 9	6.50	6.50	CAS004-4-HA03-02-1199	2.57	1.57	3.54	2.30	6.32	1 / 9	1.03	--	-- / --	--	**YES**	0.56	0.41	NO
Endrin ketone	3.30 - 4.80	2 / 9	8.90	19.0	CAS004-4-HA05-01-1199	4.59	5.88	8.24	2.91	1.95	2 / 9	9.74	--	-- / --	--	**YES**	4.22	2.35	**YES**
gamma-Chlordane	1.70 - 3.40	1 / 9	4.30	4.30	CAS004-4-HA05-01-1199	1.44	1.10	2.13	1.24	11.0	0 / 9	0.39	--	-- / --	--	NO	--	--	NO
Heptachlor	1.70 - 3.40	1 / 9	9.90	9.90	CAS004-4-HA05-01-1199	2.07	2.95	3.90	1.36	52.9	0 / 9	0.19	--	-- / --	--	NO	--	--	NO
Methoxychlor	17.0 - 34.0	1 / 9	25.0	25.0	CAS004-4-HA05-01-1199	12.4	5.43	15.8	11.6	500	0 / 9	0.05	--	-- / --	--	NO	--	--	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	9 / 9	3,670	29,400	CAS04-SB01-1109	12,368	9,372	18,177	9,664	pH < 5.5	8 / 9	--	13,000	3 / 9	2.26	**YES**	mean pH < 5.5		**YES**
Antimony	0.53 - 1.10	5 / 9	0.040	0.15	CAS04-SB01-1109	0.21	0.16	0.31	0.16	78.0	0 / 9	0.002	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	9 / 9	0.62	6.90	CAS04-SB01-1109	3.47	2.14	4.79	2.71	18.0	0 / 9	0.38	--	-- / --	--	NO	--	--	NO
Barium	-- - --	9 / 9	20.2	247	CAS004-4-HA04-01-1199	55.2	72.5	100	37.9	330	0 / 9	0.75	--	-- / --	--	NO	--	--	NO
Beryllium	0.31 - 0.55	5 / 9	0.35	0.57	CAS04-SB05-1109	0.36	0.16	0.46	0.33	40.0	0 / 9	0.01	--	-- / --	--	NO	--	--	NO
Cadmium	0.080 - 2.20	3 / 9	0.070	1.20	CAS004-4-HA05-01-1199	0.52	0.46	0.80	0.28	32.0	0 / 9	0.04	--	-- / --	--	NO	--	--	NO
Calcium[2]	-- - --	9 / 9	108	5,970	CAS004-4-HA04-01-1199	1,707	2,162	3,047	710	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	9 / 9	6.10	39.6	CAS04-SB01-1109	19.1	12.7	27.0	15.4	64.0	0 / 9	0.62	--	-- / --	--	NO	--	--	NO
Cobalt	-- - --	9 / 9	1.60	4.30	CAS004-4-HA03-02-1199	3.00	0.93	3.58	2.86	13.0	0 / 9	0.33	--	-- / --	--	NO	--	--	NO
Copper	2.00 - 4.40	7 / 9	2.70	40.4	CAS004-4-HA03-02-1199	12.8	15.8	22.6	5.66	70.0	0 / 9	0.58	--	-- / --	--	NO	--	--	NO
Cyanide	0.030 - 0.84	1 / 9	0.44	0.44	CAS004-4-HA04-01-1199	0.27	0.19	0.39	0.13	15.8	0 / 9	0.03	--	-- / --	--	NO	--	--	NO

Table B-7
Ecological Screening Statistics - Site 4 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Iron	-- - --	9 / 9	3,830	31,600	CAS04-SB01-1109	14,610	9,536	20,521	11,489	5 < pH > 8	6 / 9	--	32,000	0 / 9	0.99	NO	--	--	NO
Lead	-- - --	9 / 9	4.40	45.3	CAS004-4-HA03-02-1199	19.6	16.6	29.9	14.0	120	0 / 9	0.38	--	-- / --	--	NO	--	--	NO
Magnesium [2]	-- - --	9 / 9	327	1,670	CAS04-SB05-1109	925	534	1,256	782	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Manganese	-- - --	9 / 9	22.7	120	CAS004-4-HA03-02-1199	55.2	35.9	77.5	46.6	220	0 / 9	0.55	--	-- / --	--	NO	--	--	NO
Mercury	0.030 - 0.030	8 / 9	0.010	0.91	CAS004-4-HA03-02-1199	0.28	0.38	0.51	0.078	0.10	4 / 9	9.10	0.14	3 / 9	6.50	**YES**	5.12	2.75	**YES**
Nickel	3.50 - 7.70	7 / 9	2.80	17.3	CAS004-4-HA03-02-1199	7.04	5.23	10.3	5.55	38.0	0 / 9	0.46	--	-- / --	--	NO	--	--	NO
Potassium [2]	249 - 249	8 / 9	305	1,910	CAS04-SB05-1109	828	630	1,218	610	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	0.72 - 0.94	6 / 9	0.20	0.78	CAS004-4-HA02-02-1199	0.41	0.17	0.52	0.39	0.52	1 / 9	1.50	0.64	1 / 9	1.22	**YES**	1.00	0.80	NO
Sodium [2]	11.6 - 57.1	5 / 9	15.8	54.8	CAS04-SB01-1109	25.8	13.6	34.2	22.3	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Thallium	0.070 - 0.75	1 / 9	0.33	0.33	CAS04-SB01-1109	0.21	0.14	0.29	0.15	1.00	0 / 9	0.33	--	-- / --	--	NO	--	--	NO
Vanadium	10.1 - 10.1	8 / 9	7.80	57.7	CAS04-SB01-1109	26.0	21.8	39.6	18.3	130	0 / 9	0.44	--	-- / --	--	NO	--	--	NO
Zinc	28.6 - 28.6	8 / 9	7.80	373	CAS004-4-HA04-01-1199	107	147	198	41.2	120	3 / 9	3.11	28.0	4 / 9	13.3	**YES**	1.65	0.89	NO
Other Parameters																			
pH	-- - --	5 / 5	4.40	5.80	CAS04-SB02-1109	4.98	0.52	5.48	4.96	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	5 / 5	3,400	6,100	CAS04-SB03-1109	4,620	1,205	5,769	4,491	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-8
Exceedances - Site 4 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS004-4HA02	CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SB01	CAS04-SB02	CAS04-SB03	CAS04-SB04	CAS04-SB05
Sample ID			CAS004-4-HA02-02-1199	CAS004-4-HA03-02-1199	CAS004-4-HA04-01-1199	CAS004-4-HA05-01-1199	CAS04-SB01-1109	CAS04-SB02-1109	CAS04-SB03-1109	CAS04-SB04-1109	CAS04-SB05-1109
Sample Date			11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Volatile Organic Compounds (UG/KG)											
2-Butanone	--	--	**8 J**	14.2 U	20.4 U	13.0 U	28 UJ	27 UJ	27 UJ	27 UJ	28 U
Acetone	--	--	43 B	14.2 U	20.4 U	13.0 U	74 B	46 B	76 B	**120 J**	**98**
Chloroform	1,844	--	13.7 U	14.2 U	20.4 U	13.0 U	7 UJ	6 UJ	6 UJ	**1 J**	7 U
Ethylbenzene	1,815	--	**2 J**	14.2 U	20.4 U	13.0 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Methylene chloride	1,250	--	7 B	17 B	13 B	12 B	28 UJ	27 UJ	27 UJ	**12 J**	28 U
Tetrachloroethene	179	--	13.7 U	**3 J**	20.4 U	13.0 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Toluene	40,000	--	13.7 U	14.2 U	20.4 U	13.0 U	6 UJ	5 UJ	5 UJ	**2 J**	6 U
Semivolatile Organic Compounds (UG/KG)											
Benzo(a)anthracene	HMW PAH	--	**77 J**	11,000 UJ	17,000 UJ	4,300 U	**8.5 J**	**7.3 J**	**6.2 J**	21 U	**6.2 J**
Benzo(a)pyrene	HMW PAH	--	**110 J**	11,000 UJ	17,000 UJ	**550 J**	23 U	20 U	23 U	21 U	23 U
Benzo(b)fluoranthene	HMW PAH	--	**130 J**	11,000 UJ	17,000 UJ	**510 J**	23 U	20 U	23 U	21 U	23 U
Benzo(g,h,i)perylene	HMW PAH	--	**79 J**	11,000 UJ	17,000 UJ	4,300 U	23 UL	20 UL	23 UL	21 UL	23 UL
Benzo(k)fluoranthene	HMW PAH	--	**64 J**	11,000 UJ	17,000 UJ	**490 J**	23 U	20 U	23 U	21 U	23 U
bis(2-Ethylhexyl)phthalate	30,000	--	670 B	**63,000 J**	2,600 B	4,300 U	110 U	100 U	120 U	110 U	120 U
Chrysene	HMW PAH	--	**130 J**	11,000 UJ	17,000 UJ	4,300 U	23 U	20 U	23 U	21 U	23 U
Di-n-butylphthalate	40,000	--	66 B	5,700 B	**90,000 J**	4,300 U	110 U	100 U	120 U	110 U	120 U
Fluoranthene	LMW PAH	--	**160 J**	11,000 UJ	17,000 UJ	**880 J**	23 U	20 U	23 U	21 U	23 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	**66 J**	11,000 UJ	17,000 UJ	4,300 U	23 U	20 U	23 U	21 U	23 U
PAH (HMW)	18,000	--	**1,106**	49,500 U	76,500 U	**13,230**	**101**	**87.3**	**98.2**	94.5 U	**98.2**
PAH (LMW)	29,000	--	**1,940**	49,500 U	76,500 U	**18,080**	104 U	90 U	104 U	94.5 U	104 U
Phenanthrene	LMW PAH	--	**100 J**	11,000 UJ	17,000 UJ	4,300 U	23 U	20 U	23 U	21 U	23 U
Pyrene	HMW PAH	--	**210 J**	11,000 UJ	17,000 UJ	**930 J**	23 U	20 U	23 U	21 U	23 U
Pesticide/Polychlorinated Biphenyls (UG/KG)											
4,4'-DDD	583	--	**4.5 L**	4.6 U	6.7 U	4.3 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
4,4'-DDE	114	--	**5.3 P**	4.6 U	**24 J**	**10 J**	3.6 UJ	3.3 U	3.8 UL	3.3 UJ	3.4 UJ
4,4'-DDT	100	--	**5.8 P**	4.6 U	**13 J**	**150 L**	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Aldrin	3.63	--	2.5 UL	2.4 U	3.4 U	**27 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
alpha-Chlordane	11.0	--	2.5 UL	2.4 U	3.4 U	**2.4 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Aroclor-1242	8,000	--	48 UL	46 U	67 U	**2,300 L**	20 U	18 U	21 U	18 U	18 U
Aroclor-1260	8,000	--	48 UL	**51 K**	**330 J**	**1,600 L**	20 U	18 U	21 U	18 U	18 U
Endosulfan II	6.32	--	4.8 UL	**6.5 K**	6.7 U	4.3 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Endrin ketone	1.95	--	4.8 UL	4.6 U	**8.9 J**	**19 J**	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
gamma-Chlordane	11.0	--	2.5 UL	2.4 U	3.4 U	**4.3 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Heptachlor	52.9	--	2.5 UL	2.4 U	3.4 U	**9.9 J**	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Methoxychlor	500	--	25 UL	24 U	34 U	**25 J**	19 UJ	17 U	20 U	17 UJ	18 UJ
Explosives (UG/KG)											
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)											
Aluminum	pH < 5.5	13,000	**3,670 L**	**9,660 L**	**7,520 L**	**5,850 L**	**29,400**	**5,310**	**22,800**	**6,400**	**20,700**
Antimony	78.0	--	0.53 U	0.53 U	0.69 U	1.1 B	**0.15 L**	**0.04 L**	**0.12 L**	**0.05 L**	**0.12 L**
Arsenic	18.0	5.54	**1.8 L**	**2.9 L**	**3.9 L**	**3.7 L**	**6.9**	**0.62**	**4.8**	**0.89**	**5.7**
Barium	330	84.5	**20.2 J**	**48 J**	**247**	**30.6 J**	**42.8**	**28.6**	**32 J**	**25.8 J**	**22 J**
Beryllium	40.0	0.52	0.31 B	0.39 B	0.4 B	0.55 B	**0.49 J**	**0.35 J**	**0.48**	**0.53**	**0.57**
Cadmium	32.0	--	0.08 U	0.08 U	**0.96 J**	**1.2 J**	2.2 U	0.73 U	0.94 U	0.86 U	**0.07 J**
Chromium	64.0	33.7	**6.9**	**15.9**	**13.4**	**17.4**	**39.6 K**	**6.1 K**	**32**	**7.3**	**33.4**
Cobalt	13.0	5.18	**1.6 J**	**4.3 J**	**3.8 J**	**2.8 J**	**3.9**	**1.8**	**3.4**	**2.6**	**2.8**
Copper	70.0	3.17	4.4 B	**40.4**	**30**	**30.1**	**2.9 K**	**2.8 K**	**2.7**	2 B	**3.4**
Cyanide	15.8	2.70	0.03 UL	0.03 UL	**0.44 L**	0.03 UL	0.84 U	0.77 U	0.77 U	0.77 U	0.77 U
Iron	5 < pH > 8	32,000	**4,960 L**	**19,300 L**	**12,100 L**	**12,700 L**	**31,600**	**3,830**	**20,900 J**	**4,300 J**	**21,800 J**
Lead	120	8.79	**11.3**	**45.3**	**42.3**	**36.2**	**11 K**	**4.4 K**	**9.7**	**5.1**	**10.7**
Manganese	220	176	**28.3**	**120**	**105**	**40.4**	**32.7 K**	**72.8 K**	**28 J**	**47.2 J**	**22.7 J**
Mercury	0.10	0.14	**0.1 J**	**0.91**	**0.9**	**0.44**	**0.05**	0.03 U	**0.04**	**0.01 J**	**0.01 J**
Nickel	38.0	17.6	3.5 B	**17.3**	**13.6**	7.7 B	**8 J**	**2.8 J**	**6.7**	**3.6**	**5.8**
Selenium	0.52	0.64	**0.78 J**	0.72 U	0.94 U	0.79 U	**0.51 J**	**0.2 J**	**0.45 J**	**0.3 J**	**0.26 J**
Thallium	1.00	--	0.58 UL	0.58 UL	0.75 UL	0.63 UL	**0.33**	0.07 B	0.23 B	0.08 B	0.16 B

Table B-8
Exceedances - Site 4 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS004-4HA02	CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS04-SB01	CAS04-SB02	CAS04-SB03	CAS04-SB04	CAS04-SB05
Sample ID			CAS004-4-HA02-02-1199	CAS004-4-HA03-02-1199	CAS004-4-HA04-01-1199	CAS004-4-HA05-01-1199	CAS04-SB01-1109	CAS04-SB02-1109	CAS04-SB03-1109	CAS04-SB04-1109	CAS04-SB05-1109
Sample Date			11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Vanadium	130	48.3	10.1 B	**12.2**	**17.1**	**20.5**	**57.7**	**7.8**	**53.7**	**8.4**	**51.8**
Zinc	120	28.0	28.6 B	**334**	**373**	**150**	**28.2 K**	**7.8 K**	**22.6**	**11.5**	**22.2**
Other Parameters											
pH	--	--	NA	NA	NA	NA	**5**	**5.8**	**4.7**	**5**	**4.4**
Total organic carbon (TOC) (MG/KG)	--	--	NA	NA	NA	NA	**4,800**	**3,400**	**6,100**	**5,400**	**3,400**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

Table B-9
Hazard Quotients for Terrestrial Food Web Exposures (Maximum) - Site 4
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Meadow Vole			Short-tailed Shrew			White-footed Mouse			Red Fox			American Robin			Red-tailed Hawk		
	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL
Metals																		
Arsenic	**2.96E+00**	**1.32E+00**	5.92E-01	**2.29E+00**	**1.02E+00**	4.57E-01	**1.24E+00**	5.55E-01	2.48E-01	3.93E-02	1.76E-02	7.86E-03	2.60E-01	1.50E-01	8.66E-02	3.28E-03	1.90E-03	1.09E-03
Cadmium	**1.35E+00**	4.25E-01	1.35E-01	**1.58E+01**	**4.99E+00**	**1.58E+00**	**3.56E+00**	**1.13E+00**	3.56E-01	7.59E-01	3.40E-01	1.52E-01	**5.13E+00**	**1.38E+00**	3.72E-01	2.48E-01	6.69E-02	1.80E-02
Chromium	2.39E-01	1.07E-01	4.79E-02	**5.34E+00**	**2.39E+00**	**1.07E+00**	**1.11E+00**	4.96E-01	2.22E-01	2.64E-01	1.18E-01	5.28E-02	**7.68E+00**	**3.43E+00**	**1.54E+00**	6.17E-01	2.76E-01	1.23E-01
Copper	1.30E-01	1.12E-01	9.73E-02	3.87E-01	3.35E-01	2.90E-01	1.06E-01	9.17E-02	7.94E-02	5.84E-01	5.13E-01	4.51E-01	3.83E-01	3.35E-01	2.92E-01	1.30E-01	1.14E-01	9.91E-02
Lead	8.36E-01	2.65E-01	8.36E-02	**3.21E+00**	**1.01E+00**	3.21E-01	8.16E-01	2.58E-01	8.16E-02	2.55E-01	8.08E-02	2.55E-02	**3.69E+00**	**1.65E+00**	7.39E-01	3.75E-01	1.68E-01	7.49E-02
Mercury	**1.48E+01**	**6.63E+00**	**2.97E+00**	**6.76E+01**	**3.02E+01**	**1.35E+01**	**1.75E+01**	**7.83E+00**	**3.50E+00**	3.02E-01	2.34E-01	1.81E-01	**2.42E+00**	**1.54E+00**	9.87E-01	1.27E-02	8.14E-03	5.20E-03
Nickel	4.59E-02	3.25E-02	2.30E-02	1.75E-01	1.24E-01	8.76E-02	4.66E-02	3.29E-02	2.33E-02	1.94E-02	1.23E-02	7.77E-03	5.14E-02	4.37E-02	3.72E-02	4.45E-03	3.78E-03	3.22E-03
Selenium	**1.52E+00**	**1.18E+00**	9.19E-01	9.76E-01	7.60E-01	5.92E-01	5.71E-01	4.45E-01	3.46E-01	3.12E-01	2.43E-01	1.89E-01	5.78E-01	3.74E-01	2.42E-01	1.14E-01	7.38E-02	4.78E-02
Zinc	4.23E-01	2.99E-01	2.12E-01	**3.10E+00**	**2.20E+00**	**1.55E+00**	7.36E-01	5.21E-01	3.68E-01	**2.07E+00**	9.24E-01	4.13E-01	**1.71E+01**	**5.68E+00**	**1.89E+00**	**2.46E+00**	8.19E-01	2.72E-01
Polychlorinated Biphenyls																		
Aroclor-1242	4.97E-01	2.22E-01	9.94E-02	**1.38E+01**	**6.17E+00**	**2.76E+00**	**2.93E+00**	**1.31E+00**	5.86E-01	**2.29E+00**	**1.02E+00**	4.57E-01	**2.02E+00**	9.02E-01	4.03E-01	7.24E-01	3.24E-01	1.45E-01
Aroclor-1260	9.11E-01	4.07E-01	1.82E-01	**3.72E+01**	**1.66E+01**	**7.44E+00**	**7.78E+00**	**3.48E+00**	**1.56E+00**	**5.99E+00**	**2.70E+00**	**1.21E+00**	**5.36E+00**	**2.40E+00**	**1.07E+00**	**1.92E+00**	8.60E-01	3.85E-01
Pesticides																		
4,4'-DDE	2.03E-03	9.08E-04	4.06E-04	7.13E-02	3.19E-02	1.43E-02	1.50E-02	6.71E-03	3.00E-03	9.49E-03	4.25E-03	1.90E-03	4.96E-02	1.57E-02	4.96E-03	1.11E-01	4.98E-02	2.23E-02
4,4'-DDT	1.08E-02	4.83E-03	2.16E-03	3.65E-01	1.63E-01	7.29E-02	7.65E-02	3.42E-02	1.53E-02	4.86E-02	2.18E-02	9.73E-03	2.54E-01	8.05E-02	2.54E-02	5.71E-01	2.55E-01	1.14E-01
Aldrin	3.95E-03	1.77E-03	7.91E-04	6.68E-02	2.99E-02	1.34E-02	1.43E-02	6.39E-03	2.86E-03	1.16E-02	5.19E-03	2.32E-03	8.51E-02	3.81E-02	1.70E-02	3.07E-02	1.37E-02	6.14E-03
alpha-Chlordane	9.69E-06	6.85E-06	4.84E-06	6.25E-05	4.42E-05	3.13E-05	2.16E-05	1.53E-05	1.08E-05	1.18E-05	8.35E-06	5.91E-06	6.11E-05	2.73E-05	1.22E-05	2.19E-05	9.81E-06	4.39E-06
Endosulfan II	3.88E-03	1.74E-03	7.76E-04	5.66E-03	2.53E-03	1.13E-03	2.42E-03	1.08E-03	4.84E-04	2.67E-04	1.19E-04	5.34E-05	6.48E-05	2.90E-05	1.30E-05	2.31E-05	1.03E-05	4.62E-06
Endrin	9.86E-03	4.41E-03	1.97E-03	6.75E-02	3.02E-02	1.35E-02	1.61E-02	7.22E-03	3.23E-03	1.31E-02	5.84E-03	2.61E-03	3.08E-01	1.38E-01	6.16E-02	1.10E-01	4.94E-02	2.21E-02
gamma-Chlordane	9.50E-05	6.72E-05	4.75E-05	1.60E-03	1.13E-03	7.98E-04	3.47E-04	2.45E-04	1.73E-04	2.77E-04	1.96E-04	1.39E-04	1.53E-03	6.83E-04	3.05E-04	5.50E-04	2.46E-04	1.10E-04
Semivolatile Organics																		
Acenaphthene	1.47E-04	1.04E-04	7.37E-05	6.02E-05	4.25E-05	3.01E-05	4.67E-05	3.30E-05	2.34E-05	6.39E-06	4.52E-06	3.20E-06	5.29E-03	2.37E-03	1.06E-03	6.90E-07	3.09E-07	1.38E-07
Anthracene	4.68E-05	2.09E-05	9.37E-06	3.27E-05	1.46E-05	6.53E-06	1.69E-05	7.56E-06	3.38E-06	2.43E-06	1.08E-06	4.85E-07	5.47E-03	2.45E-03	1.09E-03	2.00E-06	8.95E-07	4.00E-07
Benzo(a)anthracene	1.77E-02	7.93E-03	3.55E-03	2.86E-02	1.28E-02	5.72E-03	8.59E-03	3.84E-03	1.72E-03	1.46E-03	6.53E-04	2.92E-04	5.69E-03	2.54E-03	1.14E-03	3.40E-06	1.52E-06	6.80E-07
Benzo(a)pyrene	2.65E-02	1.18E-02	5.30E-03	6.84E-02	3.06E-02	1.37E-02	1.69E-02	7.56E-03	3.38E-03	2.78E-03	1.24E-03	5.55E-04	1.12E-02	5.01E-03	2.24E-03	2.40E-06	1.07E-06	4.80E-07
Benzo(b)fluoranthene	2.86E-02	1.28E-02	5.73E-03	3.83E-02	1.71E-02	7.67E-03	1.24E-02	5.55E-03	2.48E-03	2.24E-03	1.00E-03	4.48E-04	8.29E-03	3.71E-03	1.66E-03	5.80E-06	2.59E-06	1.16E-06
Benzo(g,h,i)perylene	8.56E-03	3.83E-03	1.71E-03	2.20E-02	9.86E-03	4.41E-03	4.71E-03	2.10E-03	9.41E-04	1.14E-03	5.08E-04	2.27E-04	3.36E-03	1.50E-03	6.72E-04	1.60E-06	7.16E-07	3.20E-07
Benzo(k)fluoranthene	1.80E-02	8.05E-03	3.60E-03	3.75E-02	1.68E-02	7.51E-03	9.43E-03	4.22E-03	1.89E-03	1.86E-03	8.33E-04	3.72E-04	6.47E-03	2.89E-03	1.29E-03	1.50E-06	6.71E-07	3.00E-07
Chrysene	3.57E-02	1.60E-02	7.14E-03	7.89E-02	3.53E-02	1.58E-02	2.15E-02	9.63E-03	4.31E-03	3.13E-03	1.40E-03	6.25E-04	1.40E-02	6.27E-03	2.80E-03	8.00E-07	3.58E-07	1.60E-07
Dibenz(a,h)anthracene	1.51E-04	6.74E-05	3.01E-05	5.32E-04	2.38E-04	1.06E-04	1.72E-04	7.68E-05	3.43E-05	2.84E-05	1.27E-05	5.67E-06	7.50E-05	3.36E-05	1.50E-05	2.00E-06	8.95E-07	4.00E-07
Fluoranthene	2.85E-04	1.27E-04	5.69E-05	3.51E-04	1.57E-04	7.01E-05	1.26E-04	5.64E-05	2.52E-05	1.85E-05	8.29E-06	3.71E-06	2.06E-02	9.20E-03	4.11E-03	3.20E-06	1.43E-06	6.40E-07
Fluorene	6.01E-05	2.69E-05	1.20E-05	2.50E-05	1.12E-05	4.99E-06	1.89E-05	8.44E-06	3.78E-06	2.76E-06	1.24E-06	5.53E-07	3.05E-03	1.37E-03	6.11E-04	2.00E-06	8.95E-07	4.00E-07
Indeno(1,2,3-cd)pyrene	9.28E-03	4.15E-03	1.86E-03	4.36E-02	1.95E-02	8.71E-03	9.15E-03	4.09E-03	1.83E-03	1.44E-03	6.46E-04	2.89E-04	5.98E-03	2.67E-03	1.20E-03	2.40E-06	1.07E-06	4.80E-07
Phenanthrene	4.23E-04	1.89E-04	8.46E-05	2.73E-04	1.22E-04	5.45E-05	1.47E-04	6.59E-05	2.95E-05	2.15E-05	9.62E-06	4.30E-06	2.41E-02	1.08E-02	4.82E-03	8.80E-07	3.94E-07	1.76E-07
Pyrene	1.12E-01	4.99E-02	2.23E-02	1.03E-01	4.61E-02	2.06E-02	4.45E-02	1.99E-02	8.90E-03	6.26E-03	2.80E-03	1.25E-03	2.89E-02	1.29E-02	5.77E-03	2.90E-06	1.30E-06	5.80E-07

Shaded cells indicate HQ > 1

Table B-10
Hazard Quotients for Terrestrial Food Web Exposures (95% UCL) - Site 4
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Meadow Vole			Short-tailed Shrew			White-footed Mouse			Red Fox			American Robin			Red-tailed Hawk		
	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL
Metals																		
Arsenic	6.13E-02	2.74E-02	1.23E-02	4.88E-01	2.18E-01	9.75E-02	7.72E-02	3.45E-02	1.54E-02	5.16E-03	2.31E-03	1.03E-03	2.11E-02	1.22E-02	7.02E-03	5.50E-04	3.17E-04	1.83E-04
Cadmium	4.38E-02	1.38E-02	4.38E-03	6.94E-01	2.20E-01	6.94E-02	1.14E-01	3.61E-02	1.14E-02	4.96E-02	2.22E-02	9.91E-03	2.20E-01	5.93E-02	1.60E-02	2.23E-02	5.99E-03	1.61E-03
Chromium	2.40E-02	1.07E-02	4.81E-03	2.47E-01	1.10E-01	4.93E-02	3.25E-02	1.45E-02	6.50E-03	2.37E-02	1.06E-02	4.74E-03	3.41E-01	1.53E-01	6.82E-02	6.01E-02	2.69E-02	1.20E-02
Lead	2.04E-02	6.46E-03	2.04E-03	2.11E-01	6.66E-02	2.11E-02	2.74E-02	8.68E-03	2.74E-03	2.07E-02	6.55E-03	2.07E-03	1.84E-01	8.22E-02	3.67E-02	3.34E-02	1.49E-02	6.68E-03
Mercury	4.28E-01	1.91E-01	8.55E-02	**1.31E+00**	5.87E-01	2.62E-01	2.86E-01	1.28E-01	5.71E-02	1.37E-02	1.06E-02	8.22E-03	5.48E-02	3.50E-02	2.24E-02	1.72E-03	1.10E-03	7.04E-04
Selenium	7.46E-02	5.81E-02	4.52E-02	2.18E-01	1.70E-01	1.32E-01	5.01E-02	3.90E-02	3.04E-02	2.62E-02	2.04E-02	1.59E-02	6.36E-02	4.12E-02	2.67E-02	1.01E-02	6.56E-03	4.25E-03
Zinc	1.91E-02	1.35E-02	9.56E-03	1.82E-01	1.29E-01	9.12E-02	3.10E-02	2.19E-02	1.55E-02	1.33E-01	5.97E-02	2.67E-02	9.73E-01	3.24E-01	1.08E-01	1.84E-01	6.14E-02	2.04E-02
Polychlorinated Biphenyls																		
Aroclor-1242	4.47E-02	2.00E-02	8.95E-03	7.05E-01	3.16E-01	1.41E-01	1.15E-01	5.15E-02	2.30E-02	1.30E-01	5.81E-02	2.60E-02	1.07E-01	4.78E-02	2.14E-02	4.83E-02	2.16E-02	9.66E-03
Aroclor-1260	6.45E-02	2.89E-02	1.29E-02	**2.02E+00**	9.05E-01	4.05E-01	3.13E-01	1.40E-01	6.27E-02	3.48E-01	1.57E-01	7.06E-02	2.91E-01	1.30E-01	5.82E-02	1.32E-01	5.89E-02	2.63E-02

Shaded cells indicate HQ > 1

Table B-11 Hazard Quotients for Terrestrial Food Web Exposures (Mean) - Site 4 Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*																		
	Meadow Vole			**Short-tailed Shrew**			**White-footed Mouse**			**Red Fox**			**American Robin**			**Red-tailed Hawk**		
Chemical	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**
Metals																		
Arsenic	4.36E-02	1.95E-02	8.73E-03	3.72E-01	1.66E-01	7.44E-02	5.44E-02	2.43E-02	1.09E-02	3.67E-03	1.64E-03	7.34E-04	1.60E-02	9.24E-03	5.33E-03	3.24E-04	1.87E-04	1.08E-04
Cadmium	2.37E-02	7.49E-03	2.37E-03	3.75E-01	1.19E-01	3.75E-02	6.18E-02	1.96E-02	6.18E-03	2.68E-02	1.20E-02	5.36E-03	1.19E-01	3.21E-02	8.64E-03	1.20E-02	3.24E-03	8.73E-04
Chromium	1.68E-02	7.53E-03	3.37E-03	1.73E-01	7.73E-02	3.46E-02	2.28E-02	1.02E-02	4.55E-03	1.66E-02	7.42E-03	3.32E-03	2.39E-01	1.07E-01	4.78E-02	4.21E-02	1.88E-02	8.42E-03
Lead	1.17E-02	3.69E-03	1.17E-03	1.20E-01	3.80E-02	1.20E-02	1.57E-02	4.96E-03	1.57E-03	1.18E-02	3.74E-03	1.18E-03	1.05E-01	4.69E-02	2.10E-02	1.91E-02	8.53E-03	3.82E-03
Mercury	2.31E-01	1.03E-01	4.62E-02	7.08E-01	3.17E-01	1.42E-01	1.54E-01	6.91E-02	3.09E-02	7.42E-03	5.74E-03	4.45E-03	2.96E-02	1.89E-02	1.21E-02	9.35E-04	5.98E-04	3.82E-04
Selenium	5.50E-02	4.29E-02	3.34E-02	1.60E-01	1.25E-01	9.72E-02	3.72E-02	2.90E-02	2.25E-02	1.93E-02	1.51E-02	1.17E-02	4.68E-02	3.03E-02	1.96E-02	7.47E-03	4.84E-03	3.13E-03
Zinc	1.04E-02	7.38E-03	5.22E-03	9.94E-02	7.03E-02	4.97E-02	1.69E-02	1.19E-02	8.44E-03	7.28E-02	3.25E-02	1.46E-02	5.31E-01	1.77E-01	5.87E-02	1.01E-01	3.35E-02	1.11E-02
Polychlorinated Biphenyls																		
Aroclor-1242	1.76E-02	7.86E-03	3.51E-03	2.73E-01	1.22E-01	5.46E-02	4.49E-02	2.01E-02	8.98E-03	5.03E-02	2.25E-02	1.01E-02	4.14E-02	1.85E-02	8.27E-03	1.87E-02	8.36E-03	3.74E-03
Aroclor-1260	2.76E-02	1.23E-02	5.52E-03	8.58E-01	3.84E-01	1.72E-01	1.33E-01	5.96E-02	2.66E-02	1.48E-01	6.65E-02	2.99E-02	1.23E-01	5.51E-02	2.47E-02	5.58E-02	2.50E-02	1.12E-02
Shaded cells indicate HQ > 1																		

Table B-12
Ecological Screening Statistics - Site 4 Stream Surface Water
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Semivolatile Organic Compounds (UG/L)																
Benzo(k)fluoranthene	0.19 - 0.19	1 / 5	0.069	0.069	CAS04-SW05-1209	0.090	0.012	0.10	0.089	9.07	0 / 5	0.01	NO	--	--	NO
bis(2-Ethylhexyl)phthalate	0.94 - 0.96	3 / 5	0.48	1.50	CAS04-SW07-1209	0.89	0.56	1.42	0.75	32.0	0 / 5	0.05	NO	--	--	NO
Fluoranthene	0.19 - 0.19	2 / 5	0.11	0.18	CAS04-SW05-1209	0.12	0.037	0.15	0.11	8.10	0 / 5	0.02	NO	--	--	NO
Phenanthrene	0.19 - 0.19	2 / 5	0.069	0.088	CAS04-SW05-1209	0.088	0.011	0.099	0.088	6.30	0 / 5	0.01	NO	--	--	NO
Pyrene	0.19 - 0.19	3 / 5	0.065	0.29	CAS04-SW05-1209	0.16	0.099	0.25	0.13	0.025	3 / 5	11.6	**YES**	9.97	6.20	**YES**
Inorganics (UG/L)																
Aluminum	300 - 300	4 / 5	83.1	1,120	CAS04-SW07-1209	417	427	824	274	87.0	3 / 5	12.9	**NO[3]**	9.47	4.80	**NO[3]**
Arsenic	1.60 - 5.00	1 / 5	58.0	58.0	CAS04-SW09-1209	13.3	25.0	37.1	3.73	150	0 / 5	0.39	NO	--	--	NO
Barium	-- - --	5 / 5	25.6	42.5	CAS04-SW09-1209	30.2	7.14	37.0	29.6	4.00	5 / 5	10.6	**YES**	9.25	7.55	**NO[3]**
Beryllium	1.00 - 1.00	1 / 5	0.060	0.060	CAS04-SW07-1209	0.41	0.20	0.60	0.33	0.66	0 / 5	0.09	NO	--	--	NO
Cadmium	1.00 - 1.00	3 / 5	0.16	0.45	CAS04-SW07-1209	0.38	0.15	0.52	0.35	0.65	0 / 5	0.70	NO	--	--	NO
Calcium [2]	-- - --	5 / 5	114,000	132,000	CAS04-SW05-1209	126,400	7,503	133,554	126,215	NSV	-- / --	--	NO	--	--	NO
Cobalt	-- - --	5 / 5	0.29	1.10	CAS04-SW07-1209	0.61	0.31	0.90	0.55	23.0	0 / 5	0.05	NO	--	--	NO
Copper	-- - --	5 / 5	1.30	7.00	CAS04-SW07-1209	2.94	2.43	5.25	2.33	25.5	0 / 5	0.27	NO	--	--	NO
Iron	-- - --	5 / 5	339	30,300	CAS04-SW09-1209	6,709	13,201	19,294	1,398	1,000	2 / 5	30.3	**YES**	19.3	6.71	**YES**
Lead	0.18 - 0.36	3 / 5	1.20	2.60	CAS04-SW07-1209	1.11	1.04	2.10	0.60	14.2	0 / 5	0.18	NO	--	--	NO
Magnesium [2]	-- - --	5 / 5	2,000	2,660	CAS04-SW09-1209	2,212	264	2,463	2,200	NSV	-- / --	--	NO	--	--	NO
Manganese	-- - --	5 / 5	11.8	250	CAS04-SW09-1209	73.4	102	171	35.1	120	1 / 5	2.08	**YES**	1.42	0.61	NO
Nickel	0.60 - 1.50	1 / 5	2.00	2.00	CAS04-SW07-1209	0.79	0.70	1.46	0.60	141	0 / 5	0.01	NO	--	--	NO
Potassium [2]	1,380 - 1,440	3 / 5	1,680	2,230	CAS04-SW07-1209	1,500	757	2,222	1,323	NSV	-- / --	--	NO	--	--	NO
Selenium	5.00 - 5.00	4 / 5	0.82	1.30	CAS04-SW06-1209	1.42	0.63	2.03	1.33	5.00	0 / 5	0.26	NO	--	--	NO
Sodium [2]	-- - --	5 / 5	5,480	8,260	CAS04-SW07-1209	7,384	1,152	8,483	7,303	NSV	-- / --	--	NO	--	--	NO
Vanadium	0.72 - 2.10	1 / 5	4.60	4.60	CAS04-SW07-1209	1.48	1.77	3.17	0.95	20.0	0 / 5	0.23	NO	--	--	NO
Zinc	3.20 - 3.20	4 / 5	12.6	31.4	CAS04-SW07-1209	16.1	10.7	26.3	11.4	325	0 / 5	0.10	NO	--	--	NO
Dissolved Metals (UG/L)																
Arsenic	5.00 - 5.00	1 / 5	16.6	16.6	CAS04-SW09-1209	5.32	6.31	11.3	3.65	150	0 / 5	0.11	NO	--	--	NO
Barium	-- - --	5 / 5	23.8	25.4	CAS04-SW07-1209	24.2	0.68	24.9	24.2	4.00	5 / 5	6.35	**YES**	6.22	6.06	**NO[3]**
Cadmium	1.00 - 1.00	3 / 5	0.14	0.19	CAS04-SW08-1209	0.30	0.18	0.48	0.26	0.56	0 / 5	0.34	NO	--	--	NO
Calcium [2]	-- - --	5 / 5	114,000	128,000	CAS04-SW05-1209	124,000	6,164	129,877	123,874	NSV	-- / --	--	NO	--	--	NO
Cobalt	-- - --	5 / 5	0.20	0.67	CAS04-SW09-1209	0.49	0.18	0.66	0.45	23.0	0 / 5	0.03	NO	--	--	NO
Iron	5.20 - 100	1 / 5	5,680	5,680	CAS04-SW09-1209	1,148	2,533	3,564	26.3	1,000	1 / 5	5.68	**YES**	3.56	1.15	**YES**
Magnesium [2]	-- - --	5 / 5	1,860	3,110	CAS04-SW09-1209	2,212	514	2,702	2,171	NSV	-- / --	--	NO	--	--	NO
Manganese	-- - --	5 / 5	5.30	268	CAS04-SW09-1209	69.6	112	177	24.1	120	1 / 5	2.23	**YES**	1.47	0.58	NO
Potassium [2]	1,320 - 1,380	3 / 5	1,680	2,150	CAS04-SW08-1209	1,422	702	2,091	1,260	NSV	-- / --	--	NO	--	--	NO
Selenium	5.00 - 5.00	2 / 5	0.84	1.60	CAS04-SW08-1209	1.99	0.75	2.70	1.84	4.61	0 / 5	0.35	NO	--	--	NO
Sodium [2]	-- - --	5 / 5	5,550	8,030	CAS04-SW07-1209	7,312	1,053	8,316	7,244	NSV	-- / --	--	NO	--	--	NO
Vanadium	5.00 - 5.00	2 / 5	1.10	1.20	CAS04-SW07-1209	1.96	0.74	2.67	1.83	20.0	0 / 5	0.06	NO	--	--	NO
Zinc	5.20 - 16.0	1 / 5	19.8	19.8	CAS04-SW09-1209	8.55	6.59	14.8	6.90	320	0 / 5	0.06	NO	--	--	NO
Other Parameters																
Hardness (UG/L)	-- - --	5 / 5	297,000	338,000	CAS04-SW05-1209	324,200	16,514	339,944	323,853	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-13
Exceedances - Site 4 Stream Surface Water
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Surface Water Screening Value	CAS04-SW05	CAS04-SW06	CAS04-SW07		CAS04-SW08	CAS04-SW09
Sample ID		CAS04-SW05-1209	CAS04-SW06-1209	CAS04-SW07-1209	CAS04-SW07P-1209	CAS04-SW08-1209	CAS04-SW09-1209
Sample Date		12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Volatile Organic Compounds (UG/L)							
No Detections	--	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/L)							
Benzo(k)fluoranthene	9.07	**0.069 J**	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
bis(2-Ethylhexyl)phthalate	32.0	0.94 U	0.96 U	0.96 U	**1.5**	**1.5**	**0.48 J**
Fluoranthene	8.10	**0.18 J**	0.19 U	0.19 U	0.19 U	0.19 U	**0.11 J**
Phenanthrene	6.30	**0.088 J**	0.19 U	0.19 U	0.19 U	0.19 U	**0.069 J**
Pyrene	0.025	**0.29 J**	0.19 U	0.19 U	**0.065 J**	0.19 U	**0.23 J**
Pesticide/Polychlorinated Biphenyls (UG/L)							
No Detections	--	NA	NA	NA	NA	NA	NA
Inorganics (UG/L)							
Aluminum	87.0	**83.1 J**	300 U	**248 J**	**1,120**	**215 J**	**518**
Arsenic	150	1.6 B	5 U	5 U	5 U	5 U	**58**
Barium	4.00	**25.6**	**26.2**	**26.5**	**30.3**	**26.3**	**42.5**
Beryllium	0.66	1 U	1 U	1 U	**0.06 J**	1 U	1 U
Cadmium	0.647	1 U	**0.16 J**	**0.3 J**	**0.45 J**	**0.28 J**	1 U
Cobalt	23.0	**0.29 J**	**0.4 J**	**0.66 J**	**1.1**	**0.63 J**	**0.61 J**
Copper	25.5	**1.3**	**1.4**	**2.3**	**7**	**3.4**	**1.6**
Iron	1,000	**682**	**339**	**353**	**1,800**	**424**	**30,300**
Lead	14.2	0.36 B	0.18 B	**0.67 J**	**2.6**	**1.2**	**1.5**
Manganese	120	**72.8**	**19.8**	**6.6**	**12.5**	**11.8**	**250**
Nickel	141	0.65 B	1.1 B	1.4 B	**2 J**	1.5 B	0.6 B
Selenium	5.00	**0.82 J**	**1.3 J**	**1.3 J**	**1.1 J**	**1.2 J**	5 U
Vanadium	20.0	0.72 B	1 B	1.3 B	**4.6 J**	1.8 B	2.1 B
Zinc	325	3.2 B	**12.6 J**	**16.8 J**	**31.4**	**18.2 J**	**16.5 J**
Dissolved Metals (UG/L)							
Arsenic	150	5 U	5 U	5 U	5 U	5 U	**16.6**
Barium	4.00	**23.8**	**24.3**	**24.4**	**25.4**	**23.9**	**23.8**
Cadmium	0.556	1 U	**0.14 J**	**0.18 J**	**0.18 J**	**0.19 J**	1 U
Cobalt	23.0	**0.2 J**	**0.53 J**	**0.43 J**	**0.49 J**	**0.56 J**	**0.67 J**
Iron	1,000	8.7 B	5.2 B	13.3 B	100 U	7.9 B	**5,680**
Manganese	120	**49.6**	**18.8**	**4.4 J**	**5.3**	**6.2**	**268**
Selenium	4.61	5 U	5 U	5 U	**0.84 J**	**1.6 J**	5 U
Vanadium	20.0	5 U	5 U	**1.2 J**	**1.2 J**	**1.1 J**	5 U
Zinc	320	5.2 B	11.9 B	14.8 B	16 B	12.8 B	**19.8 J**
Other Parameters							
Hardness (UG/L)	--	**338,000**	**330,000**	**335,000**	NA	**321,000**	**297,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed

Table B-14
Ecological Screening Statistics - Site 4 Stream Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Volatile Organic Compounds (UG/KG)																						
2-Butanone	33.0 - 34.0	3 / 5	25.0	51.0	CAS04-SD05-1209A	30.7	15.9	45.9	27.5	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	579	0 / 5	0.09	--	--	NO
Acetone	34.0 - 42.0	3 / 5	120	230	CAS04-SD05-1209A	112	93.1	200	70.0	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Carbon disulfide	6.00 - 8.00	1 / 5	2.00	2.00	CAS04-SD05-1209A	3.20	0.76	3.92	3.12	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	1.82	1 / 5	1.10	--	--	**NO[3]**
Tetrachloroethene	-- - --	5 / 5	4.00	15.0	CAS04-SD09-1209A	9.20	5.07	14.0	8.04	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	1,136	0 / 5	0.01	--	--	NO
Semivolatile Organic Compounds (UG/KG)																						
Acenaphthene	26.0 - 29.0	2 / 5	3.20	12.0	CAS04-SD05-1209A	11.2	4.58	15.6	9.95	290	0 / 5	0.04	NO	--	--	NO	1,329	0 / 5	0.01	--	--	NO
Acenaphthylene	26.0 - 29.0	2 / 5	5.40	30.0	CAS04-SD05-1209A	15.3	8.99	23.9	13.3	160	0 / 5	0.19	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Anthracene	26.0 - 29.0	2 / 5	2.30	55.0	CAS04-SD05-1209A	19.7	20.4	39.1	12.6	57.2	0 / 5	0.96	NO	--	--	NO	472	0 / 5	0.12	--	--	NO
Benzo(a)anthracene	7.40 - 28.0	2 / 5	53.0	420	CAS04-SD05-1209A	99.5	180	271	24.1	108	1 / 5	3.89	**YES**	2.51	0.92	NO	236	1 / 5	1.78	1.15	0.42	NO
Benzo(a)pyrene	27.0 - 27.0	4 / 5	9.00	380	CAS04-SD05-1209A	94.9	160	248	33.9	150	1 / 5	2.53	**YES**	1.65	0.63	NO	300	1 / 5	1.27	0.83	0.32	NO
Benzo(b)fluoranthene	26.0 - 40.0	2 / 5	82.0	690	CAS04-SD05-1209A	164	296	446	45.7	240	1 / 5	2.88	**YES**	1.86	0.68	NO	NSV	-- / --	NSV	NSV	NSV	NO
Benzo(g,h,i)perylene	26.0 - 27.0	3 / 5	10.0	130	CAS04-SD05-1209A	36.5	52.3	86.4	20.5	170	0 / 5	0.76	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Benzo(k)fluoranthene	26.0 - 27.0	3 / 5	11.0	150	CAS04-SD05-1209A	42.5	60.3	100	23.5	240	0 / 5	0.63	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
bis(2-Ethylhexyl)phthalate	140 - 180	1 / 5	100	100	CAS04-SD08-1209A	82.0	13.0	94.4	81.2	750	0 / 5	0.13	NO	--	--	NO	1,908,160	0 / 5	0.0001	--	--	NO
Carbazole	26.0 - 26.0	4 / 5	6.00	23.0	CAS04-SD05-1209A	11.6	6.88	18.2	10.3	140	0 / 5	0.16	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Chrysene	27.0 - 27.0	4 / 5	3.10	440	CAS04-SD05-1209A	106	188	285	28.0	166	1 / 5	2.65	**YES**	1.72	0.64	NO	NSV	-- / --	NSV	NSV	NSV	NO
Dibenz(a,h)anthracene	26.0 - 27.0	3 / 5	16.0	120	CAS04-SD05-1209A	35.7	47.1	80.6	22.2	33.0	1 / 5	3.64	**YES**	2.44	1.08	**NO[3]**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Fluoranthene	27.0 - 27.0	4 / 5	22.0	820	CAS04-SD05-1209A	201	348	533	64.3	423	1 / 5	1.94	**YES**	1.26	0.48	NO	6,218	0 / 5	0.13	--	--	NO
Fluorene	5.70 - 29.0	1 / 5	30.0	30.0	CAS04-SD05-1209A	14.8	9.73	24.0	11.7	77.4	0 / 5	0.39	NO	--	--	NO	1,158	0 / 5	0.03	--	--	NO
Indeno(1,2,3-cd)pyrene	27.0 - 27.0	4 / 5	11.0	300	CAS04-SD05-1209A	77.9	125	197	33.6	200	1 / 5	1.50	**YES**	0.98	0.39	NO	NSV	-- / --	NSV	NSV	NSV	NO
Naphthalene	26.0 - 32.0	1 / 5	6.00	6.00	CAS04-SD05-1209A	12.6	3.86	16.3	12.0	176	0 / 5	0.03	NO	--	--	NO	1,029	0 / 5	0.01	--	--	NO
PAH (HMW)	112 - 112	4 / 5	97.1	3,320	CAS04-SD05-1209A	816	1,408	2,159	264	2,900	1 / 5	1.14	**YES**	0.74	0.28	NO	NSV	-- / --	NSV	NSV	NSV	NO
PAH (LMW)	122 - 122	4 / 5	123	1,329	CAS04-SD05-1209A	383	533	891	207	786	1 / 5	1.69	**YES**	1.13	0.49	NO	NSV	-- / --	NSV	NSV	NSV	NO
PAH (total)	233 - 233	4 / 5	220	4,649	CAS04-SD05-1209A	1,199	1,941	3,050	482	3,553	1 / 5	1.31	**YES**	0.86	0.34	NO	NSV	-- / --	NSV	NSV	NSV	NO
Phenanthrene	27.0 - 27.0	4 / 5	9.70	340	CAS04-SD05-1209A	90.0	142	226	33.6	204	1 / 5	1.67	**YES**	1.11	0.44	NO	1,822	0 / 5	0.19	--	--	NO
Pyrene	27.0 - 27.0	4 / 5	15.0	690	CAS04-SD05-1209A	171	293	450	52.9	195	1 / 5	3.54	**YES**	2.31	0.88	NO	NSV	-- / --	NSV	NSV	NSV	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																						
4,4'-DDD	-- - --	5 / 5	1.60	34.0	CAS04-SD05-1209A	14.6	13.2	27.2	9.08	4.88	3 / 5	6.97	**YES**	5.57	3.00	**YES**	236	0 / 5	0.14	--	--	NO
4,4'-DDE	4.30 - 4.30	4 / 5	1.40	13.0	CAS04-SD09-1209A	6.47	4.85	11.1	4.74	3.16	3 / 5	4.11	**YES**	3.51	2.05	**YES**	729	0 / 5	0.02	--	--	NO
4,4'-DDT	-- - --	5 / 5	0.83	43.0	CAS04-SD08-1209A	17.9	20.3	37.3	7.65	4.16	4 / 5	10.3	**YES**	8.97	4.31	**YES**	729	0 / 5	0.06	--	--	NO
Aldrin	2.20 - 3.00	1 / 5	1.00	1.00	CAS04-SD08-1209A	1.23	0.20	1.42	1.22	2.00	0 / 5	0.50	NO	--	--	NO	NSV	-- / --	--	NSV	NSV	NO
Aroclor-1242	24.0 - 32.0	2 / 5	20.0	52.0	CAS04-SD06-1209A	22.5	16.8	38.5	19.0	59.8	0 / 5	0.87	NO	--	--	NO	364	0 / 5	0.14	--	--	NO
Aroclor-1254	22.0 - 27.0	1 / 5	330	330	CAS04-SD05-1209A	75.7	142	211	23.4	59.8	1 / 5	5.52	**YES**	3.53	1.27	**YES**	1,737	0 / 5	0.19	--	--	NO
Aroclor-1260	29.0 - 29.0	4 / 5	23.0	320	CAS04-SD05-1209A	126	140	260	64.1	59.8	2 / 5	5.35	**YES**	4.34	2.11	**YES**	1,737	0 / 5	0.18	--	--	NO
Endosulfan I	2.20 - 2.40	2 / 5	1.30	9.40	CAS04-SD05-1209A	2.84	3.67	6.34	1.81	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	6.22	1 / 5	1.51	1.02	0.46	NO
Endosulfan II	-- - --	5 / 5	0.64	9.40	CAS04-SD05-1209A	3.11	3.62	6.56	1.96	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	30.0	0 / 5	0.31	--	--	NO
Endosulfan sulfate	4.30 - 5.90	2 / 5	3.40	18.0	CAS04-SD08-1209A	5.83	6.82	12.3	4.00	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	11.6	1 / 5	1.55	1.07	0.50	NO
Endrin aldehyde	4.30 - 5.30	1 / 5	13.0	13.0	CAS04-SD05-1209A	4.48	4.77	9.02	3.30	2.22	1 / 5	5.86	**YES**	4.06	2.02	**YES**	42.9	0 / 5	0.30	--	--	NO
gamma-BHC (Lindane)	2.20 - 3.00	1 / 5	0.78	0.78	CAS04-SD06-1209A	1.19	0.27	1.45	1.16	2.37	0 / 5	0.33	NO	--	--	NO	7.93	0 / 5	0.10	--	--	NO
gamma-Chlordane	2.20 - 2.20	4 / 5	1.40	12.0	CAS04-SD05-1209A	3.62	4.70	8.10	2.26	3.24	1 / 5	3.70	**YES**	2.50	1.12	**YES**	6,003	0 / 5	0.002	--	--	NO
Heptachlor	2.20 - 2.70	1 / 5	1.70	1.70	CAS04-SD05-1209A	1.31	0.24	1.53	1.29	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	146	0 / 5	0.01	--	--	NO
Inorganics (MG/KG)																						
Aluminum	-- - --	5 / 5	5,510	11,600	CAS04-SD07-1209A	8,216	2,545	10,642	7,909	25,500	0 / 5	0.45	NO	--	--	NO	--	-- / --	--	--	--	--
Arsenic	-- - --	5 / 5	2.50	10.4	CAS04-SD09-1209A	5.28	3.04	8.18	4.70	9.79	1 / 5	1.06	**YES**	0.84	0.54	NO	--	-- / --	--	--	--	--
Barium	-- - --	5 / 5	17.1	31.6	CAS04-SD05-1209A	23.5	5.98	29.2	22.9	20.0	3 / 5	1.58	**YES**	1.46	1.18	**NO[3]**	--	-- / --	--	--	--	--
Beryllium	-- - --	5 / 5	0.34	0.65	CAS04-SD07-1209A	0.47	0.14	0.60	0.45	NSV	-- / --	NSV	**YES**	NSV	NSV	**NO[3]**	--	-- / --	--	--	--	--
Cadmium	-- - --	5 / 5	0.16	0.65	CAS04-SD08-1209A	0.35	0.20	0.54	0.30	0.99	0 / 5	0.66	NO	--	--	NO	--	-- / --	--	--	--	--
Calcium [2]	-- - --	5 / 5	2,270	12,400	CAS04-SD08-1209A	7,552	4,939	12,261	5,861	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Chromium	-- - --	5 / 5	9.40	27.2	CAS04-SD07-1209A	16.6	7.17	23.4	15.4	43.4	0 / 5	0.63	NO	--	--	NO	--	-- / --	--	--	--	--
Cobalt	-- - --	5 / 5	1.30	2.70	CAS04-SD05-1209A	2.16	0.63	2.76	2.08	50.0	0 / 5	0.05	NO	--	--	NO	--	-- / --	--	--	--	--
Copper	-- - --	5 / 5	3.50	24.6	CAS04-SD08-1209A	8.98	8.88	17.4	6.69	31.6	0 / 5	0.78	NO	--	--	NO	--	-- / --	--	--	--	--
Iron	-- - --	5 / 5	6,400	13,600	CAS04-SD08-1209A	10,378	3,550	13,762	9,840	20,000	0 / 5	0.68	NO	--	--	NO	--	-- / --	--	--	--	--
Lead	-- - --	5 / 5	5.70	17.5	CAS04-SD05-1209A	10.7	5.21	15.7	9.69	35.8	0 / 5	0.49	NO	--	--	NO	--	-- / --	--	--	--	--

Table B-14
Ecological Screening Statistics - Site 4 Stream Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Magnesium [2]	-- - --	5 / 5	545	1,750	CAS04-SD08-1209A	1,259	492	1,728	1,164	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Manganese	-- - --	5 / 5	20.2	62.2	CAS04-SD08-1209A	34.3	19.4	52.8	30.4	460	0 / 5	0.14	NO	--	--	NO	--	-- / --	--	--	--	--
Mercury	-- - --	5 / 5	0.010	0.12	CAS04-SD05-1209A	0.042	0.045	0.085	0.029	0.18	0 / 5	0.67	NO	--	--	NO	--	-- / --	--	--	--	--
Nickel	-- - --	5 / 5	2.90	7.40	CAS04-SD07-1209A	5.66	1.87	7.44	5.36	22.7	0 / 5	0.33	NO	--	--	NO	--	-- / --	--	--	--	--
Potassium [2]	-- - --	5 / 5	501	1,940	CAS04-SD07-1209A	1,304	554	1,832	1,184	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Selenium	1.50 - 1.50	4 / 5	0.25	0.87	CAS04-SD05-1209A	0.51	0.28	0.78	0.46	2.00	0 / 5	0.44	NO	--	--	NO	--	-- / --	--	--	--	--
Sodium [2]	29.2 - 106	1 / 5	140	140	CAS04-SD08-1209A	49.3	53.1	99.9	33.0	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Thallium	1.30 - 2.00	1 / 5	0.50	0.50	CAS04-SD09-1209A	0.75	0.19	0.93	0.73	NSV	-- / --	NSV	**YES**	NSV	NSV	**NO[3]**	--	-- / --	--	--	--	--
Vanadium	-- - --	5 / 5	12.2	30.6	CAS04-SD07-1209A	20.2	7.10	26.9	19.2	57.0	0 / 5	0.54	NO	--	--	NO	--	-- / --	--	--	--	--
Zinc	-- - --	5 / 5	20.1	64.5	CAS04-SD08-1209A	41.8	20.0	60.9	37.4	121	0 / 5	0.53	NO	--	--	NO	--	-- / --	--	--	--	--
Other Parameters																						
pH --	- --	5 / 5	7.20	8.20	CAS04-SD07-1209A	7.76	0.43	8.17	7.75	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	5 / 5	2,300	40,000	CAS04-SD09-1209A	21,440	16,294	36,974	14,418	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-15
Exceedances - Site 4 Stream Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209A	CAS04-SD06-1209A	CAS04-SD07-1209A	CAS04-SD07P-1209A	CAS04-SD08-1209A	CAS04-SD09-1209A
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Volatile Organic Compounds (UG/KG)								
2-Butanone	--	579	**51 J**	**25 J**	29 U	33 U	34 UJ	**44 J**
Acetone	--	--	**230 J**	**120 J**	24 B	34 B	42 B	**170 J**
Carbon disulfide	--	1.82	**2.0 J**	7 UJ	6 U	6 U	7 UJ	8 UJ
Tetrachloroethene	--	1,136	**14 J**	**8 J**	6 U	**5 J**	**4 J**	**15 J**
Semivolatile Organic Compounds (UG/KG)								
Acenaphthene	290	1,329	**12 J**	29 U	25 U	27 U	26 U	**3.2 J**
Acenaphthylene	160	--	**30 J**	29 U	25 U	27 U	26 U	**5.4 J**
Anthracene	57.2	472	**55**	29 U	25 U	27 U	26 U	**2.3 J**
Benzo(a)anthracene	108	236	**420**	28 B	7.3 B	7.4 B	14 B	**53**
Benzo(a)pyrene	150	300	**380**	**18 J**	25 U	27 U	**9 J**	**54**
Benzo(b)fluoranthene	240	--	**690**	40 B	25 U	27 U	26 U	**82**
Benzo(g,h,i)perylene	170	--	**130 L**	**10 L**	25 UL	27 UL	26 UL	**16 L**
Benzo(k)fluoranthene	240	--	**150**	**11 J**	25 U	27 U	26 U	**25 J**
bis(2-Ethylhexyl)phthalate	750	1,908,160	180 U	140 U	130 U	140 U	**100 J**	160 U
Carbazole	140	--	**23 J**	**7.2 J**	**6 J**	27 U	26 U	**9 J**
Chrysene	166	--	**440**	**17 J**	25 U	27 U	**3.1 J**	**55**
Dibenz(a,h)anthracene	33.0	--	**120**	**16 J**	25 U	27 U	26 U	**16 J**
Fluoranthene	423	6,218	**820**	**41**	25 U	27 U	**22 J**	**110**
Fluorene	77.4	1,158	**30 J**	29 U	25 U	27 U	26 U	5.7 B
Indeno(1,2,3-cd)pyrene	200	--	**300**	**23 J**	25 U	27 U	**11 J**	**42**
Naphthalene	176	1,029	**6 J**	29 U	25 U	27 U	26 U	32 U
PAH (HMW)	2,900	--	**3,320**	**156**	104 U	112 U	**97.1**	**453**
PAH (LMW)	786	--	**1,329**	**156**	113 U	122 U	**123**	**246**
PAH (total)	3,553	--	**4,649**	**312**	216 U	233 U	**220**	**699**
Phenanthrene	204	1,822	**340**	**13 J**	25 U	27 U	**9.7 J**	**74**
Pyrene	195	--	**690**	**27 J**	25 U	27 U	**15 J**	**110**
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	4.88	236	**34 J**	**4.5 J**	**1.6 J**	4.3 UJ	**21 J**	**12 J**
4,4'-DDE	3.16	729	**9.1 J**	**1.4 J**	4.1 U	4.3 UJ	**6.7**	**13 J**
4,4'-DDT	4.16	729	**37 J**	**4.3 J**	4.1 U	**0.83 J**	**43 J**	**4.6 J**
Aldrin	2.00	--	3 UJ	2.4 UJ	2.1 U	2.2 UJ	**1 J**	2.7 UJ
Aroclor-1242	59.8	364	32 U	**52 J**	22 U	24 U	25 U	**20 J**
Aroclor-1254	59.8	1,737	**330**	24 U	21 U	22 U	24 U	27 U
Aroclor-1260	59.8	1,737	**320**	**44**	**23**	24 U	**230**	29 U
Endosulfan I	--	6.22	**9.4 J**	2.4 UJ	2.1 U	2.2 UJ	2.4 U	**1.3 J**
Endosulfan II	--	30.0	**9.4 J**	**1.1 J**	**0.64 J**	4.3 UJ	**2.9 J**	**1.5 J**
Endosulfan sulfate	--	11.6	5.9 UJ	**3.4 J**	4.1 U	4.3 UJ	**18 J**	5.3 UJ
Endrin aldehyde	2.22	42.9	**13 J**	4.6 UJ	4.1 U	4.3 UJ	4.6 U	5.3 UJ
gamma-BHC (Lindane)	2.37	7.93	3 UJ	**0.78 J**	2.1 U	2.2 UJ	2.4 U	2.7 UJ
gamma-Chlordane	3.24	6,003	**12 J**	**1.6 J**	2.1 U	2.2 UJ	**1.4 J**	**2 J**
Heptachlor	--	146	**1.7 J**	2.4 UJ	2.1 U	2.2 UJ	2.4 U	2.7 UJ
Inorganics (MG/KG)								
Aluminum	25,500	--	**10,100**	**5,510**	**11,400**	**11,600**	**6,550**	**7,320**
Arsenic	9.79	--	**4.9 L**	**2.5 L**	**3.3 L**	**3.6 L**	**5 L**	**10.4 L**
Barium	20.0	--	**31.6**	**17.1**	**27.7**	**26.9**	**19.5**	**21.8**
Beryllium	NSV	--	**0.57 J**	**0.34 J**	**0.65**	**0.64**	**0.39 J**	**0.38 J**
Cadmium	0.99	--	**0.32**	**0.17**	**0.44**	**0.36**	**0.65**	**0.16**
Chromium	43.4	--	**18.5 L**	**10.5 L**	**27.2 L**	**25.9 L**	**17.3 L**	**9.4 L**
Cobalt	50.0	--	**2.7 J**	**1.3 J**	**2.7**	**2.6 J**	**2.4 J**	**1.7 J**
Copper	31.6	--	**7.5 J**	**3.7 J**	**2.5 J**	**3.5 J**	**24.6 J**	**5.6 J**
Iron	20,000	--	**13,200**	**6,690**	**11,800**	**12,000**	**13,600**	**6,400**
Lead	35.8	--	**17.5**	**5.7**	**5.7**	**5.6**	**10.6**	**14.2**

Table B-15
Exceedances - Site 4 Stream Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209A	CAS04-SD06-1209A	CAS04-SD07-1209A	CAS04-SD07P-1209A	CAS04-SD08-1209A	CAS04-SD09-1209A
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Manganese	460	--	**47.4**	**20.2**	**16.5**	**20.2**	**62.2**	**21.7**
Mercury	0.18	--	**0.12**	**0.02 J**	**0.02 J**	**0.02 J**	**0.01 J**	**0.04 J**
Nickel	22.7	--	**6.5**	**2.9 J**	**7**	**7.4**	**6.9**	**4.6 J**
Selenium	2.00	--	**0.87 J**	**0.37 J**	**0.3 J**	**0.33 J**	**0.25 J**	1.5 U
Thallium	NSV	--	2 U	1.5 U	1.1 U	1.7 U	1.3 U	**0.5 J**
Vanadium	57.0	--	**23**	**12.2**	**30.4**	**30.6**	**19.5**	**15.6**
Zinc	121	--	**53.2**	**20.1**	**19.7**	**21.2**	**64.5**	**49.9**
Other Parameters								
pH	--	--	**7.4**	**8.0**	**8.2**	NA	**8.0**	**7.2**
Total organic carbon (TOC) (MG/KG)	--	--	**36,000**	**19,000**	**2,300**	NA	**9,900**	**40,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Exceeds EqP

Table B-16

Ecological Screening Statistics - Site 4 Stream Subsurface Sediment

Sites 4, 9, and AOC 3 Site Investigation Report

Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Volatile Organic Compounds (UG/KG)																						
2-Butanone	28.0 - 32.0	3 / 5	14.0	26.0	CAS04-SD06-1209B	17.6	4.98	22.3	17.1	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	372	0 / 5	0.07	--	--	NO
Acetone	8.00 - 22.0	3 / 5	87.0	130	CAS04-SD06-1209B	68.4	57.7	123	35.3	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO**[3]
Carbon disulfide	6.00 - 7.00	1 / 5	1.00	1.00	CAS04-SD06-1209B	2.80	1.04	3.79	2.56	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	1.17	0 / 5	0.85	--	--	NO
Tetrachloroethene	7.00 - 7.00	4 / 5	2.00	17.0	CAS04-SD06-1209B	8.10	7.70	15.4	5.20	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	730	0 / 5	0.02	--	--	NO
Semivolatile Organic Compounds (UG/KG)																						
Acenaphthene	24.0 - 30.0	1 / 5	3.50	3.50	CAS04-SD05-1209B	11.4	4.55	15.7	10.2	290	0 / 5	0.01	NO	--	--	NO	854	0 / 5	0.004	--	--	NO
Acenaphthylene	24.0 - 30.0	1 / 5	10.0	10.0	CAS04-SD05-1209B	12.7	1.86	14.5	12.6	160	0 / 5	0.06	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Anthracene	24.0 - 30.0	1 / 5	11.0	11.0	CAS04-SD05-1209B	12.9	1.52	14.3	12.8	57.2	0 / 5	0.19	NO	--	--	NO	303	0 / 5	0.04	--	--	NO
Benzo(a)anthracene	12.0 - 26.0	1 / 5	130	130	CAS04-SD05-1209B	33.1	54.3	84.8	14.5	108	1 / 5	1.20	**YES**	0.79	0.31	NO	152	0 / 5	0.86	--	--	NO
Benzo(a)pyrene	26.0 - 26.0	4 / 5	6.00	130	CAS04-SD05-1209B	33.0	54.3	84.8	14.4	150	0 / 5	0.87	NO	--	--	NO	193	0 / 5	0.67	--	--	NO
Benzo(b)fluoranthene	14.0 - 30.0	1 / 5	220	220	CAS04-SD05-1209B	52.8	93.5	142	19.3	240	0 / 5	0.92	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Benzo(g,h,i)perylene	26.0 - 30.0	2 / 5	8.60	56.0	CAS04-SD05-1209B	21.2	19.6	39.9	16.6	170	0 / 5	0.33	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Benzo(k)fluoranthene	26.0 - 27.0	3 / 5	4.20	46.0	CAS04-SD05-1209B	16.5	17.0	32.7	11.4	240	0 / 5	0.19	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
bis(2-Ethylhexyl)phthalate	130 - 150	2 / 5	89.0	100	CAS04-SD05-1209B	78.8	15.4	93.5	77.6	750	0 / 5	0.13	NO	--	--	NO	1,226,420	0 / 5	0.0001	--	--	NO
Carbazole	26.0 - 26.0	4 / 5	6.50	9.60	CAS04-SD05-1209B	8.78	2.62	11.3	8.50	140	0 / 5	0.07	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Chrysene	24.0 - 27.0	2 / 5	5.50	130	CAS04-SD05-1209B	34.8	53.3	85.6	17.2	166	0 / 5	0.78	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Dibenz(a,h)anthracene	26.0 - 27.0	3 / 5	12.0	48.0	CAS04-SD05-1209B	20.1	15.6	35.0	17.0	33.0	1 / 5	1.45	**YES**	1.06	0.61	NO	NSV	-- / --	NSV	NSV	NSV	NO
Fluoranthene	26.0 - 26.0	4 / 5	10.0	250	CAS04-SD05-1209B	62.0	105	162	25.3	423	0 / 5	0.59	NO	--	--	NO	3,996	0 / 5	0.06	--	--	NO
Indeno(1,2,3-cd)pyrene	26.0 - 26.0	4 / 5	8.10	110	CAS04-SD05-1209B	31.4	44.0	73.4	18.1	200	0 / 5	0.55	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
PAH (HMW)	117 - 117	4 / 5	75.5	1,060	CAS04-SD05-1209B	279	437	696	136	2,900	0 / 5	0.37	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
PAH (LMW)	117 - 117	4 / 5	99.2	424	CAS04-SD05-1209B	167	146	306	132	786	0 / 5	0.54	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
PAH (total)	234 - 234	4 / 5	175	1,484	CAS04-SD05-1209B	446	582	1,001	274	3,553	0 / 5	0.42	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Pentachlorophenol	130 - 150	1 / 5	19.0	19.0	CAS04-SD08-1209B	59.8	23.3	82.1	53.8	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	695	0 / 5	0.03	--	--	NO
Phenanthrene	26.0 - 26.0	4 / 5	5.20	100	CAS04-SD05-1209B	27.1	40.9	66.0	13.7	204	0 / 5	0.49	NO	--	--	NO	1,171	0 / 5	0.09	--	--	NO
Pyrene	26.0 - 26.0	4 / 5	5.30	190	CAS04-SD05-1209B	47.7	79.7	124	19.7	195	0 / 5	0.97	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																						
4,4'-DDD	4.30 - 5.00	3 / 5	4.70	14.0	CAS04-SD09-1209B	6.35	4.95	11.1	4.95	4.88	2 / 5	2.87	**YES**	2.27	1.30	**YES**	152	0 / 5	0.09	--	--	NO
4,4'-DDE	4.30 - 5.00	3 / 5	2.00	5.00	CAS04-SD09-1209B	2.99	1.23	4.16	2.82	3.16	2 / 5	1.58	**YES**	1.32	0.95	NO	469	0 / 5	0.01	--	--	NO
4,4'-DDT	4.30 - 5.00	3 / 5	1.30	120	CAS04-SD08-1209B	26.8	52.2	76.6	5.85	4.16	2 / 5	28.8	**YES**	18.4	6.45	**YES**	469	0 / 5	0.26	--	--	NO
Aroclor-1254	21.0 - 26.0	1 / 5	63.0	63.0	CAS04-SD05-1209B	21.8	23.1	43.8	16.1	59.8	1 / 5	1.05	**YES**	0.73	0.36	NO	1,116	0 / 5	0.06	--	--	NO
Aroclor-1260	23.0 - 28.0	2 / 5	30.0	72.0	CAS04-SD05-1209B	27.9	25.8	52.5	21.1	59.8	1 / 5	1.20	**YES**	0.88	0.47	NO	1,116	0 / 5	0.06	--	--	NO
Dieldrin	4.00 - 5.00	1 / 5	3.30	3.30	CAS04-SD09-1209B	2.47	0.50	2.95	2.43	1.90	1 / 5	1.74	**YES**	1.55	1.30	**YES**	71.7	0 / 5	0.05	--	--	NO
Endosulfan I	2.10 - 2.60	2 / 5	0.63	2.70	CAS04-SD05-1209B	1.36	0.79	2.11	1.21	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	4.00	0 / 5	0.68	--	--	NO
Endosulfan II	4.00 - 5.00	1 / 5	2.20	2.20	CAS04-SD05-1209B	2.21	0.18	2.38	2.20	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	19.3	0 / 5	0.11	--	--	NO
Endosulfan sulfate	4.30 - 5.00	1 / 5	2.00	2.00	CAS04-SD08-1209B	2.25	0.20	2.44	2.24	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	7.44	0 / 5	0.27	--	--	NO
Endrin aldehyde	4.00 - 5.00	1 / 5	3.60	3.60	CAS04-SD05-1209B	2.49	0.65	3.11	2.43	2.22	1 / 5	1.62	**YES**	1.40	1.12	**YES**	27.6	0 / 5	0.13	--	--	NO
gamma-Chlordane	2.10 - 2.60	1 / 5	2.80	2.80	CAS04-SD05-1209B	1.48	0.74	2.19	1.37	3.24	0 / 5	0.86	NO	--	--	NO	3,858	0 / 5	0.001	--	--	NO
Inorganics (MG/KG)																						
Aluminum	-- - --	5 / 5	3,170	28,700	CAS04-SD07-1209B	11,180	10,223	20,927	8,381	25,500	1 / 5	1.13	**YES**	0.82	0.44	NO	--	-- / --	--	--	--	--
Arsenic	-- - --	5 / 5	2.30	13.2	CAS04-SD09-1209B	6.28	4.70	10.8	4.99	9.79	1 / 5	1.35	**YES**	1.10	0.64	NO	--	-- / --	--	--	--	--
Barium	-- - --	5 / 5	9.60	68.4	CAS04-SD07-1209B	29.4	22.9	51.3	23.7	20.0	2 / 5	3.42	**YES**	2.56	1.47	**YES**	--	-- / --	--	--	--	--
Beryllium	-- - --	5 / 5	0.21	1.80	CAS04-SD07-1209B	0.67	0.65	1.28	0.50	NSV	-- / --	NSV	**YES**	NSV	NSV	**NO**[3]	--	-- / --	--	--	--	--
Cadmium	-- - --	5 / 5	0.070	1.40	CAS04-SD07-1209B	0.42	0.55	0.95	0.25	0.99	1 / 5	1.41	**YES**	0.96	0.43	NO	--	-- / --	--	--	--	--
Calcium[2]	-- - --	5 / 5	2,600	19,800	CAS04-SD08-1209B	7,914	6,873	14,467	6,176	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Chromium	-- - --	5 / 5	10.6	71.8	CAS04-SD07-1209B	26.0	25.8	50.6	19.6	43.4	1 / 5	1.65	**YES**	1.17	0.60	NO	--	-- / --	--	--	--	--
Cobalt	-- - --	5 / 5	0.80	6.80	CAS04-SD07-1209B	2.74	2.39	5.02	2.08	50.0	0 / 5	0.14	NO	--	--	NO	--	-- / --	--	--	--	--
Copper	-- - --	5 / 5	2.50	5.90	CAS04-SD05-1209B	3.46	1.38	4.78	3.29	31.6	0 / 5	0.19	NO	--	--	NO	--	-- / --	--	--	--	--
Iron	-- - --	5 / 5	4,260	28,200	CAS04-SD07-1209B	11,610	9,755	20,911	9,147	20,000	1 / 5	1.41	**YES**	1.05	0.58	NO	--	-- / --	--	--	--	--
Lead	-- - --	5 / 5	3.40	14.3	CAS04-SD07-1209B	8.54	4.97	13.3	7.34	35.8	0 / 5	0.40	NO	--	--	NO	--	-- / --	--	--	--	--

Table B-16
Ecological Screening Statistics - Site 4 Stream Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Magnesium [2]	-- - --	5 / 5	775	4,050	CAS04-SD07-1209B	1,559	1,412	2,904	1,228	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Manganese	-- - --	5 / 5	15.9	50.4	CAS04-SD07-1209B	26.7	15.4	41.4	23.7	460	0 / 5	0.11	NO	--	--	NO	--	-- / --	--	--	--	--
Mercury	0.040 - 0.040	4 / 5	0.010	0.050	CAS04-SD05-1209B	0.026	0.018	0.043	0.021	0.18	0 / 5	0.28	NO	--	--	NO	--	-- / --	--	--	--	--
Nickel	-- - --	5 / 5	2.70	20.9	CAS04-SD07-1209B	7.54	7.61	14.8	5.50	22.7	0 / 5	0.92	NO	--	--	NO	--	-- / --	--	--	--	--
Potassium [2]	-- - --	5 / 5	839	4,710	CAS04-SD07-1209B	1,815	1,652	3,390	1,415	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Selenium	0.91 - 2.20	2 / 5	0.39	0.40	CAS04-SD05-1209B	0.58	0.30	0.86	0.53	2.00	0 / 5	0.20	NO	--	--	NO	--	-- / --	--	--	--	--
Sodium [2]	26.3 - 75.5	1 / 5	210	210	CAS04-SD08-1209B	60.3	84.2	141	33.4	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Vanadium	-- - --	5 / 5	12.1	82.0	CAS04-SD07-1209B	30.8	28.9	58.4	23.8	57.0	1 / 5	1.44	**YES**	1.02	0.54	NO	--	-- / --	--	--	--	--
Zinc	-- - --	5 / 5	11.1	54.1	CAS04-SD07-1209B	28.9	18.3	46.4	24.3	121	0 / 5	0.45	NO	--	--	NO	--	-- / --	--	--	--	--
Other Parameters																						
pH --	- --	5 / 5	7.50	8.30	CAS04-SD08-1209B	7.90	0.29	8.18	7.90	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	5 / 5	2,400	34,000	CAS04-SD06-1209B	13,780	12,948	26,124	8,550	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-17
Exceedances - Site 4 Stream Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Sediment Screening Value	EqP Value	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209B	CAS04-SD06-1209B	CAS04-SD07-1209B	CAS04-SD07P-1209B	CAS04-SD08-1209B	CAS04-SD09-1209B
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Volatile Organic Compounds (UG/KG)								
2-Butanone	--	372	14 J	26 J	32 U	30 U	28 U	18 J
Acetone	--	--	87 J	130 J	22 B	19 B	8 B	110 K
Carbon disulfide	--	1.17	7 UJ	1 J	6 U	6 U	6 U	7 U
Tetrachloroethene	--	730	16 J	17 J	6 U	2 J	2 J	7 U
Semivolatile Organic Compounds (UG/KG)								
Acenaphthene	290	854	3.5 J	30 U	25 U	26 U	24 U	27 U
Acenaphthylene	160	--	10 J	30 U	25 U	26 U	24 U	27 U
Anthracene	57.2	303	11 J	30 U	25 U	26 U	24 U	27 U
Benzo(a)anthracene	108	152	130	21 B	25 U	26 U	12 B	12 B
Benzo(a)pyrene	150	193	130	9.7 J	25 U	26 U	6.4 J	6 J
Benzo(b)fluoranthene	240	--	220	30 B	25 U	26 U	14 B	18 B
Benzo(g,h,i)perylene	170	--	56 L	30 UL	25 UL	26 UL	8.6 L	27 UL
Benzo(k)fluoranthene	240	--	46	5.6 J	25 U	26 U	4.2 J	27 U
bis(2-Ethylhexyl)phthalate	750	1,226,420	100 J	150 U	130 U	130 U	89 J	130 U
Carbazole	140	--	9.6 J	7.5 J	25 U	26 U	7.3 J	6.5 J
Chrysene	166	--	130	5.5 J	25 U	26 U	24 U	27 U
Dibenz(a,h)anthracene	33.0	--	48	12 J	25 U	26 U	14 J	27 U
Fluoranthene	423	3,996	250	23 J	25 U	26 U	10 J	14 J
Indeno(1,2,3-cd)pyrene	200	--	110	14 J	25 U	26 U	12 J	8.1 J
PAH (HMW)	2,900	--	1,060	103	113 U	117 U	75.5	97.1
PAH (LMW)	786	--	424	136	113 U	117 U	99.2	118
PAH (total)	3,553	--	1,484	239	225 U	234 U	175	215
Pentachlorophenol	--	695	150 UL	150 UL	130 UL	130 UL	19 J	130 UL
Phenanthrene	204	1,171	100	7.5 J	25 U	26 U	5.2 J	9.6 J
Pyrene	195	--	190	16 J	25 U	26 U	5.3 J	14 J
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	4.88	152	8.4 J	5 UJ	4.3 U	4.1 UJ	4.7 J	14
4,4'-DDE	3.16	469	3.3 J	5 UJ	4.3 U	4.1 UJ	2 J	5.0
4,4'-DDT	4.16	469	8.2 J	5 UJ	4.3 U	4.1 UJ	120 J	1.3 J
Aroclor-1254	59.8	1,116	63	26 U	22 U	21 U	21 U	23 U
Aroclor-1260	59.8	1,116	72	28 U	23 U	22 U	30	24 U
Dieldrin	1.90	71.7	4.8 UJ	5 UJ	4.3 U	4.1 UJ	4 U	3.3 J
Endosulfan I	--	4.00	2.7 J	2.6 UJ	2.2 U	2.1 UJ	2.1 U	0.63 J
Endosulfan II	--	19.3	2.2 J	5 UJ	4.3 U	4.1 UJ	4 U	4.4 U
Endosulfan sulfate	--	7.44	4.8 UJ	5 UJ	4.3 U	4.1 UJ	2 J	4.4 U
Endrin aldehyde	2.22	27.6	3.6 J	5 UJ	4.3 U	4.1 UJ	4 U	4.4 U
gamma-Chlordane	3.24	3,858	2.8 J	2.6 UJ	2.2 U	2.1 UJ	2.1 U	2.3 U
Inorganics (MG/KG)								
Aluminum	25,500	--	11,300	5,830	28,700 J	9,020 J	3,170	6,900
Arsenic	9.79	--	4.2 L	2.3 L	9 L	3.4 L	2.7 L	13.2 L
Barium	20.0	--	29.8	19.6	68.4 J	21.8 J	9.6	19.6
Beryllium	--	--	0.57 J	0.35 J	1.8 J	0.6 J	0.21 J	0.4 J
Cadmium	0.99	--	0.25	0.07 J	1.4 J	0.34 J	0.21	0.19
Chromium	43.4	--	19.8 L	10.6 L	71.8 L	25.5 L	13.3 L	14.5 L
Cobalt	50.0	--	2.7 J	1.2 J	6.8 J	1.9 J	0.8 J	2.2 J
Copper	31.6	--	5.9 J	2.5 J	3 J	2.9 J	3.1 J	2.8 J
Iron	20,000	--	12,300	5,740	28,200 J	8,850 J	4,260	7,550
Lead	35.8	--	13.2	4.6	14.3	4.8	3.4	7.2
Manganese	460	--	34.4	15.9	50.4	17.2	17	15.9
Mercury	0.18	--	0.05	0.01 J	0.04 J	0.01 J	0.04 U	0.01 J
Nickel	22.7	--	6.3	2.7 J	20.9	7.2	2.9	4.9
Selenium	2.00	--	0.4 J	1.1 U	2.2 U	1.1 U	0.39 J	0.91 U

Table B-17
Exceedances - Site 4 Stream Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAS04-SD05	CAS04-SD06	CAS04-SD07		CAS04-SD08	CAS04-SD09
Sample ID			CAS04-SD05-1209B	CAS04-SD06-1209B	CAS04-SD07-1209B	CAS04-SD07P-1209B	CAS04-SD08-1209B	CAS04-SD09-1209B
Sample Date			12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Vanadium	57.0	--	**24.4**	**12.1**	**82**	**29**	**17.2**	**18.5**
Zinc	121	--	**40.9**	**11.1**	**54.1 J**	**17.4 J**	**14**	**24.6**
Other Parameters								
pH	--	--	**7.8**	**7.9**	**8**	NA	**8.3**	**7.5**
Total organic carbon (TOC) (MG/KG)	--	--	**14,000**	**34,000**	**2,400**	NA	**2,500**	**16,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Exceeds EqP

Table B-18
Ecological Screening Statistics - Upstream Pond Surface Water
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Semivolatile Organic Compounds (UG/L)																
Acenaphthene	0.19 - 0.20	1 / 8	0.069	0.069	CAA03-SW02-1209	0.092	0.0096	0.099	0.092	23.0	0 / 8	0.003	NO	--	--	NO
Benzo(a)pyrene	0.19 - 0.20	2 / 8	0.073	0.24	CAS04-SW04-1209	0.11	0.053	0.15	0.10	0.014	2 / 8	17.1	**YES**	10.5	7.93	**YES**
Benzo(g,h,i)perylene	0.19 - 0.20	1 / 8	0.16	0.16	CAS04-SW04-1209	0.10	0.023	0.12	0.10	7.64	0 / 8	0.02	NO	--	--	NO
Benzo(k)fluoranthene	0.19 - 0.20	1 / 8	0.15	0.15	CAS04-SW04-1209	0.10	0.019	0.12	0.10	9.07	0 / 8	0.02	NO	--	--	NO
bis(2-Ethylhexyl)phthalate	0.94 - 0.94	5 / 8	0.75	1.30	CAS04-SW03-1209	0.78	0.31	0.99	0.73	32.0	0 / 8	0.04	NO	--	--	NO
Chrysene	0.19 - 0.20	1 / 8	0.080	0.080	CAS04-SW04-1209	0.094	0.0058	0.098	0.094	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**
Fluoranthene	0.19 - 0.20	2 / 8	0.13	0.32	CAS04-SW04-1209	0.13	0.078	0.18	0.12	8.10	0 / 8	0.04	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	0.19 - 0.20	1 / 8	0.24	0.24	CAS04-SW04-1209	0.11	0.051	0.15	0.11	4.31	0 / 8	0.06	NO	--	--	NO
Naphthalene	0.19 - 0.20	1 / 8	0.066	0.066	CAA03-SW02-1209	0.092	0.011	0.099	0.091	12.0	0 / 8	0.01	NO	--	--	NO
Phenanthrene	0.19 - 0.20	2 / 8	0.068	0.074	CAS04-SW04-1209	0.090	0.012	0.097	0.089	6.30	0 / 8	0.01	NO	--	--	NO
Pyrene	0.19 - 0.20	2 / 8	0.10	0.29	CAS04-SW04-1209	0.12	0.068	0.17	0.11	0.025	2 / 8	11.6	**YES**	6.66	4.83	**YES**
Inorganics (UG/L)																
Aluminum	26.7 - 300	5 / 8	178	2,730	CAS04-SW03-1209	511	907	1,119	187	87.0	5 / 8	31.4	**NO**[3]	12.9	5.87	**NO**[3]
Arsenic	1.70 - 5.70	1 / 8	10.3	10.3	CAS04-SW03-1209	2.89	3.04	4.93	2.17	150	0 / 8	0.07	NO	--	--	NO
Barium	-- - --	8 / 8	23.0	44.4	CAS04-SW03-1209	27.5	7.04	32.2	26.9	4.00	8 / 8	11.1	**YES**	8.06	6.88	**NO**[3]
Beryllium	1.00 - 1.00	2 / 8	0.060	0.12	CAS04-SW03-1209	0.40	0.19	0.53	0.32	0.66	0 / 8	0.18	NO	--	--	NO
Cadmium	1.00 - 1.00	7 / 8	0.11	0.82	CAS04-SW03-1209	0.29	0.25	0.46	0.23	0.44	1 / 8	1.86	**NO**[3]	1.03	0.66	NO
Calcium [2]	-- - --	8 / 8	63,500	106,000	CAS04-SW03-1209	74,688	14,310	84,273	73,642	NSV	-- / --	--	NO	--	--	NO
Cobalt	-- - --	8 / 8	0.28	1.50	CAS04-SW03-1209	0.54	0.40	0.80	0.46	23.0	0 / 8	0.07	NO	--	--	NO
Copper	-- - --	8 / 8	3.00	25.9	CAS04-SW03-1209	7.96	7.50	13.0	6.17	16.4	1 / 8	1.58	**NO**[3]	0.79	0.49	NO
Iron	-- - --	8 / 8	1,070	19,000	CAS04-SW03-1209	3,874	6,129	7,979	2,242	1,000	8 / 8	19.0	**NO**[3]	7.98	3.87	**NO**[3]
Lead	0.28 - 0.32	6 / 8	0.56	5.90	CAS04-SW03-1209	1.42	1.87	2.67	0.77	7.36	0 / 8	0.80	NO	--	--	NO
Magnesium [2]	-- - --	8 / 8	1,820	3,040	CAS04-SW03-1209	2,085	407	2,358	2,056	NSV	-- / --	--	NO	--	--	NO
Manganese	-- - --	8 / 8	42.6	142	CAS04-SW03-1209	68.6	31.4	89.7	64.1	120	1 / 8	1.18	**NO**[3]	0.75	0.57	NO
Nickel	0.73 - 1.70	1 / 8	3.50	3.50	CAS04-SW03-1209	0.96	1.04	1.66	0.73	91.1	0 / 8	0.04	NO	--	--	NO
Potassium [2]	-- - --	8 / 8	1,460	1,930	CAS04-SW03-1209	1,640	152	1,742	1,634	NSV	-- / --	--	NO	--	--	NO
Selenium	5.00 - 5.00	1 / 8	0.86	0.86	CAS04-SW04-1209	2.30	0.58	2.68	2.19	5.00	0 / 8	0.17	NO	--	--	NO
Silver	1.00 - 1.00	4 / 8	0.050	0.070	CAA03-SW04-1209	0.28	0.24	0.44	0.17	0.36	0 / 8	0.19	NO	--	--	NO
Sodium [2]	-- - --	8 / 8	4,340	5,980	CAS04-SW03-1209	4,970	520	5,319	4,947	NSV	-- / --	--	NO	--	--	NO
Vanadium	1.00 - 2.00	1 / 8	8.30	8.30	CAS04-SW03-1209	1.69	2.67	3.48	0.99	20.0	0 / 8	0.42	NO	--	--	NO
Zinc	-- - --	8 / 8	9.30	65.4	CAS04-SW03-1209	22.5	18.0	34.5	18.7	209	0 / 8	0.31	NO	--	--	NO
Dissolved Metals (UG/L)																
Barium	-- - --	8 / 8	19.8	25.5	CAA03-SW02-1209	22.5	2.00	23.8	22.4	4.00	8 / 8	6.38	**YES**	5.95	5.62	**NO**[3]
Beryllium	1.00 - 1.00	1 / 8	0.060	0.060	CAS04-SW01-1209	0.45	0.16	0.55	0.38	0.66	0 / 8	0.09	NO	--	--	NO
Cadmium	1.00 - 1.00	4 / 8	0.050	0.18	CAS04-SW01-1209	0.29	0.23	0.44	0.19	0.39	0 / 8	0.46	NO	--	--	NO
Calcium [2]	-- - --	8 / 8	61,400	99,900	CAS04-SW03-1209	72,025	12,611	80,472	71,176	NSV	-- / --	--	NO	--	--	NO
Cobalt	-- - --	8 / 8	0.13	0.45	CAS04-SW01-1209	0.29	0.098	0.36	0.28	23.0	0 / 8	0.02	NO	--	--	NO
Iron	-- - --	8 / 8	17.5	119	CAS04-SW04-1209	56.8	34.7	80.1	48.0	1,000	0 / 8	0.12	NO	--	--	NO
Magnesium [2]	-- - --	8 / 8	1,750	2,300	CAA03-SW02-1209	1,940	195	2,071	1,932	NSV	-- / --	--	NO	--	--	NO

Table B-18
Ecological Screening Statistics - Upstream Pond Surface Water
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Manganese	-- - --	8 / 8	11.4	91.9	CAS04-SW04-1209	52.8	27.2	70.9	45.4	120	0 / 8	0.77	NO	--	--	NO
Nickel	-- - --	8 / 8	0.73	1.30	CAS04-SW04-1209	1.01	0.17	1.12	1.00	90.8	0 / 8	0.01	NO	--	--	NO
Potassium [2]	-- - --	8 / 8	1,380	1,600	CAA03-SW02-1209	1,510	78.4	1,562	1,508	NSV	-- / --	--	NO	--	--	NO
Silver	1.00 - 1.00	1 / 8	0.10	0.10	CAS04-SW01-1209	0.45	0.14	0.54	0.41	0.36	0 / 8	0.28	NO	--	--	NO
Sodium [2]	-- - --	8 / 8	4,520	5,910	CAS04-SW03-1209	4,989	436	5,281	4,973	NSV	-- / --	--	NO	--	--	NO
Vanadium	0.86 - 5.00	1 / 8	0.72	0.72	CAA03-SW03-1209	1.51	1.06	2.22	1.12	20.0	0 / 8	0.04	NO	--	--	NO
Other Parameters																
Hardness (UG/L)	-- - --	8 / 8	166,000	276,000	CAS04-SW03-1209	193,250	36,503	217,701	190,672	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-19
Exceedances - Upstream Pond Surface Water
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Surface Water Screening Value**	CAA03-SW01		CAA03-SW02	CAA03-SW03	CAA03-SW04	CAS04-SW01	CAS04-SW02	CAS04-SW03	CAS04-SW04
Sample ID		CAA03-SW01-1209	CAA03-SW01P-1209	CAA03-SW02-1209	CAA03-SW03-1209	CAA03-SW04-1209	CAS04-SW01-1209	CAS04-SW02-1209	CAS04-SW03-1209	CAS04-SW04-1209
Sample Date		12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09
Volatile Organic Compounds (UG/L)										
No Detections	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/L)										
Acenaphthene	23.0	0.19 U	0.19 U	**0.069 J**	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Benzo(a)pyrene	0.014	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	**0.073 J**	**0.24 J**
Benzo(g,h,i)perylene	7.64	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.16 J**
Benzo(k)fluoranthene	9.07	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.15 J**
bis(2-Ethylhexyl)phthalate	32.0	0.94 U	0.94 U	0.94 U	**1.1**	0.94 U	**0.86 J**	**0.85 L**	**1.30**	**0.75 J**
Chrysene	--	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.08 J**
Fluoranthene	8.10	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	**0.13 J**	**0.32**
Indeno(1,2,3-cd)pyrene	4.31	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	**0.24**
Naphthalene	12.0	0.19 U	0.19 U	**0.066 J**	0.2 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Phenanthrene	6.30	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	**0.068 J**	**0.074 J**
Pyrene	0.025	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U	0.19 U	0.19 U	**0.10 J**	**0.29**
Pesticide/Polychlorinated Biphenyls (UG/L)										
No Detections	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (UG/L)										
Aluminum	87.0	300 U	44.3 B	26.7 B	**212 J**	**306**	**178 J**	108 B	**2,730**	**445**
Arsenic	150	2.9 B	3.3 B	3.3 B	5.7 B	4.4 B	3.5 B	1.7 B	**10.3**	3.8 B
Barium	4.00	**23.1**	**23.8**	**26.8**	**28.4**	**23**	**24.4**	**24.2**	**44.4**	**25.2**
Beryllium	0.66	1 U	1 U	1 U	1 U	**0.06 J**	1 U	1 U	**0.12 J**	1 U
Cadmium	0.441	**0.06 J**	**0.11 J**	1 U	**0.15 J**	**0.23 J**	**0.13 J**	**0.16 J**	**0.82 J**	**0.22 J**
Cobalt	23.0	**0.3 J**	**0.34 J**	**0.28 J**	**0.44 J**	**0.5 J**	**0.34 J**	**0.45 J**	**1.5**	**0.45 J**
Copper	16.4	**3**	**3**	**3**	**6.4**	**6.1**	**7.8**	**3.9**	**25.9**	**7.6**
Iron	1,000	**1,070**	**1,010**	**1,970**	**2,410**	**1,550**	**1,310**	**1,480**	**19,000**	**2,200**
Lead	7.36	0.32 B	0.26 B	0.28 B	**1.3**	**0.98 J**	**0.93 J**	**0.56 J**	**5.9**	**1.4**
Manganese	120	**49**	**46.9**	**66.2**	**55.5**	**66.2**	**42.6**	**53.4**	**142**	**74.2**
Nickel	91.1	1.1 B	0.92 B	0.73 B	1.5 B	1.3 B	1 B	1.1 B	**3.5 J**	1.7 B
Selenium	5.00	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**0.86 J**
Silver	0.36	1 U	1 U	1 U	**0.06 J**	**0.07 J**	1 U	**0.05 J**	**0.06 J**	1 U
Vanadium	20.0	1.7 B	0.9 B	1 B	1.4 B	1.3 B	2 B	1.4 B	**8.3**	1.7 B
Zinc	209	**17.9 J**	**15.4 J**	**9.3 J**	**20.1 J**	**16.3 J**	**12.9 J**	**13.3 J**	**65.4**	**24.4 J**
Dissolved Metals (UG/L)										
Barium	4.00	**24.4**	**23.3**	**25.5**	**21.4**	**21.6**	**19.8**	**20.8**	**24.2**	**22**
Beryllium	0.66	1 U	1 U	1 U	1 U	1 U	**0.06 J**	1 U	1 U	1 U
Cadmium	0.389	1 U	1 U	**0.05 J**	1 U	**0.05 J**	**0.18 J**	**0.06 J**	1 U	1 U
Cobalt	23.0	**0.29 J**	**0.27 J**	**0.28 J**	**0.13 J**	**0.26 J**	**0.45 J**	**0.26 J**	**0.41 J**	**0.27 J**
Iron	1,000	**30.4 J**	**29.8 J**	**30.1 J**	**54.3 J**	**55.8 J**	**96.6 J**	**50.9 J**	**17.5 J**	**119**
Manganese	120	**41.5**	**38.9**	**55.9**	**11.4**	**45.6**	**40.3**	**43.9**	**91.5**	**91.9**
Nickel	90.8	**0.83 J**	**1.1 J**	**0.97 J**	**0.73 J**	**0.88 J**	**1 J**	**1 J**	**1.1 J**	**1.3 J**
Silver	0.36	1 U	1 U	1 U	1 U	1 U	**0.1 J**	1 U	1 U	1 U
Vanadium	20.0	0.92 B	0.91 B	5 U	**0.72 J**	5 U	0.86 B	0.92 B	5 U	5 U
Other Parameters										
Hardness (UG/L)	--	**196,000**	NA	**179,000**	**170,000**	**169,000**	**166,000**	**209,000**	**276,000**	**181,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed

Table B-20
Ecological Screening Statistics - Upstream Pond Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Volatile Organic Compounds (UG/KG)																						
2-Butanone	12.0 - 42.0	4 / 12	12.0	56.0	CAA03-SD04-1209A	20.3	14.2	27.6	16.7	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	1,802	0 / 12	0.03	--	--	NO
Acetone	13.0 - 44.0	6 / 12	74.0	270	CAA03-SD02-1209A	94.5	99.5	146	46.5	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Carbon disulfide	6.00 - 26.4	2 / 12	2.00	3.00	CAA03-SD04-1209A	6.09	3.80	8.06	5.08	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	5.67	0 / 12	0.53	--	--	NO
Ethylbenzene	6.00 - 21.0	2 / 12	2.00	3.00	CAS004-4-SD04-00-1199	4.92	3.04	6.49	4.25	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	24,030	0 / 12	0.0001	--	--	NO
Methyl acetate	11.0 - 38.0	1 / 7	5.00	5.00	CAA03-SD04-1209A	8.21	4.85	11.8	7.42	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Methylcyclohexane	6.00 - 8.00	1 / 8	4.00	4.00	CAA03-SD02-1209A	3.56	0.42	3.84	3.54	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Tetrachloroethene	15.8 - 26.4	8 / 12	5.00	50.0	CAA03-SD01-1209A	20.3	17.1	29.2	15.0	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	3,538	0 / 12	0.01	--	--	NO
Toluene	6.00 - 26.4	1 / 12	3.00	3.00	CAS004-4-SD02-00-1199	5.66	3.51	7.48	4.87	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	4,472	0 / 12	0.001	--	--	NO
Xylene, total	15.8 - 64.0	1 / 12	10.0	10.0	CAS004-4-SD04-00-1199	12.0	6.48	15.4	11.1	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	1,068	0 / 12	0.01	--	--	NO
Semivolatile Organic Compounds (UG/KG)																						
2-Methylnaphthalene	25.0 - 1,600	3 / 12	4.00	19.0	CAA03-SD02-1209A	170	270	310	38.0	70.0	0 / 12	0.27	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Acenaphthene	25.0 - 1,600	6 / 12	2.90	300	CAA03-SD02-1209A	191	270	331	34.6	290	1 / 12	1.03	**YES**	1.14	0.66	NO	4,139	0 / 12	0.07	--	--	**(YES)**
Acenaphthylene	25.0 - 1,600	7 / 12	1.80	120	CAS04-SD03-1209A	183	264	320	37.6	160	0 / 12	0.75	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Anthracene	530 - 1,600	8 / 12	2.80	260	CAS04-SD03-1209A	198	262	334	49.4	57.2	3 / 12	4.55	**YES**	5.83	3.46	**YES**	1,469	0 / 12	0.18	--	--	**(YES)**
Benzo(a)anthracene	16.0 - 35.0	8 / 12	110	1,500	CAS04-SD04-1209A	340	507	603	107	108	8 / 12	13.9	**YES**	5.59	3.15	**YES**	734	2 / 12	2.04	0.82	0.46	**(YES)**
Benzo(a)pyrene	13.0 - 17.0	10 / 12	31.0	2,100	CAS04-SD03-1209A	415	668	761	125	150	7 / 12	14.0	**YES**	5.08	2.77	**YES**	935	2 / 12	2.25	0.81	0.44	**(YES)**
Benzo(b)fluoranthene	31.0 - 34.0	10 / 12	62.0	3,900	CAS04-SD03-1209A	795	1,327	1,483	235	240	7 / 12	16.3	**YES**	6.18	3.31	**YES**	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Benzo(g,h,i)perylene	7.10 - 27.0	8 / 12	56.0	1,900	CAS04-SD03-1209A	252	536	530	57.7	170	3 / 12	11.2	**YES**	3.12	1.48	**YES**	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Benzo(k)fluoranthene	8.50 - 19.0	9 / 12	24.0	1,600	CAS04-SD03-1209A	331	504	593	90.0	240	4 / 12	6.67	**YES**	2.47	1.38	**YES**	NSV	-- / --	NSV	NSV	NSV	**(YES)**
bis(2-Ethylhexyl)phthalate	120 - 420	5 / 12	110	280	CAS004-4-SD04-00-1199	123	69.6	159	108	750	0 / 12	0.37	NO	--	--	NO	5,940,750	0 / 12	0.00	--	--	NO
Carbazole	6.70 - 1,600	4 / 12	19.0	49.0	CAS04-SD04-1209A	176	267	314	45.6	140	0 / 12	0.35	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Chrysene	-- - --	12 / 12	18.0	2,700	CAS04-SD03-1209A	538	854	981	172	166	7 / 12	16.3	**YES**	5.91	3.24	**YES**	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Dibenz(a,h)anthracene	6.80 - 1,600	3 / 12	110	660	CAS04-SD03-1209A	257	286	406	83.0	33.0	3 / 12	20.0	**YES**	12.3	7.80	**YES**	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Di-n-butylphthalate	120 - 1,600	3 / 12	64.0	81.0	CAS004-4-SD03-00-1199	187	247	315	113	110	0 / 12	0.74	NO	--	--	NO	73,425	0 / 12	0.001	--	--	NO
Fluoranthene	-- - --	12 / 12	37.0	1,800	CAS04-SD04-1209A	419	485	670	233	423	4 / 12	4.26	**YES**	1.58	0.99	NO	19,358	0 / 12	0.09	--	--	**(YES)**
Fluorene	6.10 - 1,600	1 / 12	420	420	CAA03-SD02-1209A	203	275	345	45.5	77.4	1 / 12	5.43	**YES**	4.46	2.62	**YES**	3,605	0 / 12	0.12	--	--	**(YES)**
Indeno(1,2,3-cd)pyrene	9.90 - 550	7 / 12	81.0	2,800	CAS04-SD03-1209A	449	847	888	94.4	200	4 / 12	14.0	**YES**	4.44	2.25	**YES**	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Naphthalene	25.0 - 1,600	3 / 12	5.70	280	CAA03-SD02-1209A	192	267	330	49.3	176	1 / 12	1.59	**YES**	1.88	1.09	**YES**	3,204	0 / 12	0.09	--	--	**(YES)**
PAH (HMW)	-- - --	12 / 12	127	18,060	CAS04-SD03-1209A	4,037	6,095	7,196	1,324	2,900	4 / 12	6.23	**YES**	2.48	1.39	**YES**	NSV	-- / --	NSV	NSV	NSV	**YES**
PAH (LMW)	-- - --	12 / 12	105	6,510	CAS004-4-SD04-00-1199	1,888	2,089	2,971	863	786	7 / 12	8.28	**YES**	3.78	2.40	**YES**	NSV	-- / --	NSV	NSV	NSV	**YES**
PAH (total)	-- - --	12 / 12	234	18,895	CAS04-SD03-1209A	5,884	6,625	9,318	2,417	3,553	7 / 12	5.32	**YES**	2.62	1.66	**YES**	NSV	-- / --	NSV	NSV	NSV	**YES**
Pentachlorophenol	120 - 4,000	2 / 12	24.0	110	CAA03-SD02-1209A	455	665	800	167	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	3,364	0 / 12	0.03	--	--	NO
Phenanthrene	-- - --	12 / 12	19.0	420	CAA03-SD02-1209A	161	139	233	102	204	4 / 12	2.06	**YES**	1.14	0.79	NO	5,674	0 / 12	0.07	--	--	**(YES)**
Pyrene	-- - --	12 / 12	36.0	3,800	CAS04-SD04-1209A	621	1,049	1,165	246	195	8 / 12	19.5	**YES**	5.97	3.19	**YES**	NSV	-- / --	NSV	NSV	NSV	**(YES)**
Pesticide/Polychlorinated Biphenyls (UG/KG)																						
4,4'-DDD	3.60 - 7.80	5 / 12	6.60	380	CAS04-SD03-1209A	71.7	132	140	11.0	4.88	5 / 12	77.9	**YES**	28.7	14.7	**YES**	734	0 / 12	0.52	--	--	**YES[3]**
4,4'-DDE	1.00 - 6.00	7 / 12	0.92	600	CAS04-SD03-1209A	67.1	174	157	5.99	3.16	5 / 12	190	**YES**	49.7	21.2	**YES**	2,270	0 / 12	0.26	--	--	**YES[3]**
4,4'-DDT	4.80 - 7.80	6 / 12	2.10	1,600	CAS04-SD03-1209A	149	458	386	9.52	4.16	5 / 12	385	**YES**	92.9	35.8	**YES**	2,270	0 / 12	0.71	--	--	**YES[3]**
Aldrin	2.20 - 7.10	1 / 12	0.85	0.85	CAA03-SD04-1209A	1.52	0.70	1.88	1.42	2.00	0 / 12	0.43	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
alpha-Chlordane	2.20 - 7.10	2 / 12	1.70	17.0	CAS04-SD03-1209A	2.90	4.49	5.22	1.86	3.24	1 / 12	5.25	**YES**	1.61	0.89	NO	18,690	0 / 12	0.001	--	--	NO
Aroclor-1248	25.0 - 300	1 / 12	19.0	19.0	CAS004-4-SD04-00-1199	31.2	38.4	51.1	22.3	59.8	0 / 12	0.32	NO	--	--	NO	6,675	0 / 12	0.003	--	--	NO
Aroclor-1254	22.0 - 78.0	1 / 12	21,000	21,000	CAS04-SD03-1209A	1,769	6,056	4,909	33.6	59.8	1 / 12	351	**YES**	82.1	29.6	**YES**	5,407	1 / 12	3.88	0.91	0.33	**YES[3]**
Aroclor-1260	52.0 - 280	10 / 12	30.0	1,200	CAA03-SD02-1209A	222	318	387	128	59.8	8 / 12	20.1	**YES**	6.47	3.72	**YES**	5,407	0 / 12	0.22	--	--	NO
Dieldrin	2.40 - 14.0	4 / 12	1.70	1,400	CAS04-SD03-1209A	123	402	332	5.47	1.90	2 / 12	737	**YES**	175	64.7	**YES**	347	1 / 12	4.03	0.96	0.35	**YES[3]**
Endosulfan I	2.20 - 7.10	3 / 12	1.60	58.0	CAS04-SD03-1209A	6.33	16.3	14.8	2.08	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	19.4	1 / 12	3.00	0.76	0.33	**YES[3]**
Endosulfan II	4.30 - 7.80	3 / 12	1.30	830	CAS04-SD03-1209A	80.5	238	204	5.51	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	93.5	2 / 12	8.88	2.18	0.86	**YES[3]**
Endosulfan sulfate	4.30 - 14.0	2 / 12	14.0	35.0	CAA03-SD03-1209A	6.71	9.53	11.6	4.13	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	36.0	0 / 12	0.97	--	--	NO
Endrin	4.30 - 14.0	3 / 12	9.60	1,200	CAS04-SD03-1209A	105	345	283	6.15	2.22	3 / 12	541	**YES**	128	47.1	**YES**	134	1 / 12	8.99	2.12	0.78	**YES[3]**
Endrin aldehyde	4.30 - 14.0	3 / 12	3.30	290	CAS04-SD03-1209A	27.2	82.8	70.1	4.51	2.22	3 / 12	131	**YES**	31.6	12.2	**YES**	134	1 / 12	2.17	0.53	0.20	**YES[3]**
gamma-Chlordane	2.40 - 4.00	6 / 12	1.10	780	CAS04-SD03-1209A	68.2	224	184	3.61	3.24	3 / 12	241	**YES**	56.9	21.1	**YES**	18,690	0 / 12	0.04	--	--	NO
Heptachlor	2.20 - 7.10	1 / 12	0.69	0.69	CAA03-SD04-1209A	1.51	0.71	1.88	1.40	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	454	0 / 12	0.002	--	--	NO
Heptachlor epoxide	2.20 - 7.10	1 / 12	540	540	CAS04-SD03-1209A	46.4	155	127	2.40	2.47	1 / 12	219	**YES**	51.4	18.8	**YES**	454	1 / 12	1.19	0.28	0.10	**YES[3]**

Table B-20
Ecological Screening Statistics - Upstream Pond Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Methoxychlor	22.0 - 71.0	1 / 12	520	520	CAS04-SD03-1209A	57.7	146	133	19.8	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	127	1 / 12	4.10	1.05	0.45	**YES[3]**
Inorganics (MG/KG)																						
Aluminum	-- - --	12 / 12	4,210	20,400	CAS04-SD03-1209A	9,346	5,536	12,216	8,114	25,500	0 / 12	0.80	NO	--	--	NO	--	-- / --	--	--	--	--
Antimony	0.62 - 1.70	3 / 12	0.50	2.20	CAA03-SD02-1209A	0.74	0.66	1.08	0.57	3.00	0 / 12	0.73	NO	--	--	NO	--	-- / --	--	--	--	--
Arsenic	-- - --	12 / 12	3.20	43.6	CAA03-SD02-1209A	10.4	11.3	16.2	7.44	9.79	3 / 12	4.45	**YES**	1.66	1.06	**YES**	--	-- / --	--	--	--	--
Barium	-- - --	12 / 12	11.7	166	CAS04-SD04-1209A	59.2	46.7	83.4	44.5	20.0	11 / 12	8.30	**YES**	4.17	2.96	**YES**	--	-- / --	--	--	--	--
Beryllium	0.73 - 0.73	11 / 12	0.25	0.98	CAA03-SD01-1209A	0.52	0.24	0.65	0.47	NSV	-- / --	NSV	**YES**	NSV	NSV	**NO[3]**	--	-- / --	--	--	--	--
Cadmium	-- - --	12 / 12	0.11	5.70	CAS004-4-SED01-00-1199	1.87	1.94	2.87	0.97	0.99	5 / 12	5.76	**YES**	2.90	1.89	**YES**	--	-- / --	--	--	--	--
Calcium [2]	-- - --	12 / 12	704	25,200	CAS004-4-SED01-00-1199	7,775	7,390	11,606	4,867	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Chromium	-- - --	12 / 12	8.90	49.7	CAS04-SD03-1209A	21.8	14.2	29.2	18.2	43.4	1 / 12	1.15	**YES**	0.67	0.50	NO	--	-- / --	--	--	--	--
Cobalt	1.80 - 1.80	11 / 12	0.97	5.10	CAS04-SD03-1209A	2.66	1.45	3.42	2.27	50.0	0 / 12	0.10	NO	--	--	NO	--	-- / --	--	--	--	--
Copper	-- - --	12 / 12	3.30	142	CAS04-SD03-1209A	39.9	42.2	61.8	21.6	31.6	5 / 12	4.49	**YES**	1.95	1.26	**YES**	--	-- / --	--	--	--	--
Iron	-- - --	12 / 12	6,910	25,900	CAS04-SD03-1209A	14,295	6,989	17,918	12,837	20,000	3 / 12	1.30	**YES**	0.90	0.71	NO	--	-- / --	--	--	--	--
Lead	-- - --	12 / 12	9.20	417	CAS04-SD03-1209A	88.5	128	155	39.6	35.8	5 / 12	11.6	**YES**	4.32	2.47	**YES**	--	-- / --	--	--	--	--
Magnesium [2]	-- - --	12 / 12	499	2,790	CAS004-4-SED01-00-1199	1,522	838	1,957	1,300	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Manganese	-- - --	12 / 12	14.8	140	CAS04-SD03-1209A	69.6	38.9	89.7	57.5	460	0 / 12	0.30	NO	--	--	NO	--	-- / --	--	--	--	--
Mercury	0.030 - 0.040	10 / 12	0.010	0.62	CAS04-SD03-1209A	0.088	0.17	0.18	0.038	0.18	1 / 12	3.44	**YES**	0.98	0.49	NO	--	-- / --	--	--	--	--
Nickel	-- - --	12 / 12	2.20	23.6	CAS004-4-SED01-00-1199	8.49	6.50	11.9	6.63	22.7	1 / 12	1.04	**YES**	0.52	0.37	NO	--	-- / --	--	--	--	--
Potassium [2]	368 - 368	11 / 12	504	2,170	CAA03-SD01-1209A	1,064	558	1,353	900	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Selenium	0.24 - 1.10	1 / 12	1.40	1.40	CAA03-SD02-1209A	0.40	0.34	0.58	0.32	2.00	0 / 12	0.70	NO	--	--	NO	--	-- / --	--	--	--	--
Silver	2.80 - 5.60	7 / 12	0.14	6.10	CAS04-SD03-1209A	1.49	1.79	2.41	0.64	1.00	1 / 12	6.10	**YES**	2.41	1.49	**YES**	--	-- / --	--	--	--	--
Sodium [2]	23.4 - 191	1 / 12	235	235	CAA03-SD02-1209A	57.7	62.9	90.3	38.1	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Thallium	0.67 - 4.10	2 / 12	0.15	0.53	CAA03-SD01-1209A	0.72	0.52	0.99	0.59	NSV	-- / --	NSV	**YES**	NSV	NSV	**NO[3]**	--	-- / --	--	--	--	--
Vanadium	-- - --	12 / 12	12.3	53.8	CAA03-SD01-1209A	25.6	13.0	32.3	23.0	57.0	0 / 12	0.94	NO	--	--	NO	--	-- / --	--	--	--	--
Zinc	-- - --	12 / 12	11.8	475	CAS04-SD03-1209A	134	128	201	87.8	121	6 / 12	3.93	**YES**	1.66	1.11	**YES**	--	-- / --	--	--	--	--
Other Parameters																						
pH --	- --	8 / 8	6.20	7.70	CAS04-SD02-1209A	7.10	0.51	7.44	7.08	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	8 / 8	16,000	250,000	CAA03-SD02-1209A	66,750	75,662	117,431	47,123	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-21
Exceedances - Upstream Pond Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04	
Sample ID			CAA03-SD01-1209A	CAA03-SD02-1209A	CAA03-SD03-1209A	CAA03-SD04-1209A	CAS004-4-SED01-00-1199	CAS004-4-SD02-00-1199	CAS004-4-SD03-00-1199	CAS004-4-SD04-00-1199	CAS004-4-SD04-00D-1199
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99	11/13/99
Volatile Organic Compounds (UG/KG)											
2-Butanone	--	1,802	40 UJ	**39 J**	36 UJ	**56 J**	**12 J**	15 B	17.5 U	10 B	12 B
Acetone	--	--	**140 J**	**270 J**	**74 J**	**250 J**	37 B	44 B	17 B	23 B	36 B
Carbon disulfide	--	5.67	8 UJ	21 UJ	**2 J**	**3 J**	15.8 U	20.5 UL	17.5 U	19.9 U	26.4 U
Ethylbenzene	--	24,030	8 UJ	21 UJ	7 UJ	7 UJ	**2 J**	20.5 UL	17.5 U	**3 J**	26.4 U
Methyl acetate	--	--	15 UJ	38 UJ	13 UJ	**5 J**	NA	NA	NA	NA	NA
Methylcyclohexane	--	--	8 UJ	**4 J**	7 UJ	7 UJ	NA	NA	NA	NA	NA
Tetrachloroethene	--	3,538	**50 J**	**49 J**	**5 J**	**11 J**	15.8 U	20.5 UL	17.5 U	19.9 U	26.4 U
Toluene	--	4,472	8 UJ	21 UJ	7 UJ	7 UJ	15.8 U	**3 L**	17.5 U	19.9 U	26.4 U
Xylene, total	--	1,068	24 UJ	64 UJ	22 UJ	21 UJ	15.8 U	20.5 UL	17.5 U	**10 J**	26.4 U
Semivolatile Organic Compounds (UG/KG)											
2-Methylnaphthalene	70.0	--	29 UL	**19 J**	29 UL	**6.1 L**	550 U	1,200 U	530 U	1,200 U	1,600 U
Acenaphthene	290	4,139	29 U	**300**	**4.9 J**	**3.2 J**	550 U	1,200 U	530 U	1,200 U	1,600 U
Acenaphthylene	160	--	**1.8 J**	**34 J**	**5 J**	**2.6 J**	550 U	1,200 U	530 U	1,200 U	1,600 U
Anthracene	57.2	1,469	**4.6 J**	**66 J**	**16 J**	**4.1 J**	550 U	1,200 U	530 U	1,200 U	1,600 U
Benzo(a)anthracene	108	734	33 B	**260**	**110**	16 B	**140 J**	**260 J**	**170 J**	**290 J**	**270 J**
Benzo(a)pyrene	150	935	**31 J**	**250**	**120**	13 B	**160 J**	**260 J**	**170 J**	**330 J**	**340 J**
Benzo(b)fluoranthene	240	--	**62 J**	**420**	**280**	31 B	**220 J**	**370 J**	**330 J**	**450 J**	**550 J**
Benzo(g,h,i)perylene	170	--	8.3 B	**83 J**	**65 L**	27 UL	**56 J**	**130 J**	**84 J**	1,200 U	**180 J**
Benzo(k)fluoranthene	240	--	19 B	**130**	**82**	8.5 B	**120 J**	**290 J**	**170 J**	**420 J**	**440 J**
bis(2-Ethylhexyl)phthalate	750	5,940,750	140 U	420 U	150 U	130 U	**110 J**	**170 J**	**160 J**	**140 J**	**280 J**
Carbazole	140	--	6.7 B	**34 J**	**19 J**	27 U	550 U	1,200 U	530 U	1,200 U	1,600 U
Chrysene	166	--	**30 J**	**280**	**150**	**19 J**	**190 J**	**400 J**	**240 J**	**460 J**	**490 J**
Dibenz(a,h)anthracene	33.0	--	6.8 B	**110 J**	27 B	27 U	550 U	1,200 U	530 U	1,200 U	1,600 U
Di-n-butylphthalate	110	73,425	140 U	420 U	150 U	130 U	**64 J**	1,200 U	**81 J**	1,200 U	1,600 U
Fluoranthene	423	19,358	**75**	**510**	**260**	**37**	**260 J**	**640 J**	**410 J**	**600 J**	**580 J**
Fluorene	77.4	3,605	29 U	**420**	6.1 B	27 U	550 U	1,200 U	530 U	1,200 U	1,600 U
Indeno(1,2,3-cd)pyrene	200	--	19 B	**230**	**81**	27 U	550 U	**160 J**	**95 J**	1,200 U	**210 J**
Naphthalene	176	3,204	29 U	**280**	29 U	**5.7 J**	550 U	1,200 U	530 U	1,200 U	1,600 U
PAH (HMW)	2,900	--	**223**	**2,143**	**1,122**	**130**	**1,666**	**3,040**	**1,874**	**4,360**	**3,870**
PAH (LMW)	786	--	**192**	**2,091**	**432**	**105**	**2,305**	**5,170**	**2,475**	**5,140**	**6,510**
PAH (total)	3,553	--	**415**	**4,234**	**1,554**	**234**	**3,971**	**8,210**	**4,349**	**9,500**	**10,380**
Pentachlorophenol	--	3,364	140 UL	**110 J**	150 UL	130 UL	1,400 U	3,100 U	1,300 U	3,000 U	4,000 U
Phenanthrene	204	5,674	**38**	**420**	**100**	**19 J**	**120 J**	**330 J**	**210 J**	**340 J**	**330 J**
Pyrene	195	--	**57**	**380**	**220**	**36**	**230 J**	**570 J**	**350 J**	**610 J**	**590 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)											
4,4'-DDD	4.88	734	3.6 B	**97 J**	**6.6 J**	**48 J**	5.5 U	6 UL	5.2 U	6 UL	7.8 UL
4,4'-DDE	3.16	2,270	1 B	**11 J**	2.1 B	**12 J**	5.5 U	6 UL	5.2 U	**9 L**	7.8 UL
4,4'-DDT	4.16	2,270	4.8 UJ	**97 J**	**6.3 J**	**8.7 J**	5.5 U	6 UL	5.2 U	6 UL	7.8 UL
Aldrin	2.00	--	2.5 UJ	7.1 UJ	2.4 UL	**0.85 J**	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL
alpha-Chlordane	3.24	18,690	2.5 UJ	7.1 UJ	2.4 UL	**1.7 J**	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL
Aroclor-1248	59.8	6,675	27 U	79 UL	27 U	26 U	55 U	60 UL	52 U	**19 L**	78 UL
Aroclor-1254	59.8	5,407	24 U	71 UL	24 U	24 U	55 U	60 UL	52 U	60 UL	78 UL
Aroclor-1260	59.8	5,407	**160 J**	**1,200 L**	**160**	**100**	**270 K**	**91 L**	52 U	**240 L**	**25 JP**
Dieldrin	1.90	347	**1.7 J**	14 UJ	2.4 B	4.4 UJ	5.5 U	6 UL	5.2 U	6 UL	7.8 UL
Endosulfan I	--	19.4	2.5 UJ	7.1 UJ	2.4 UL	**1.6 J**	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL
Endosulfan II	--	93.5	4.8 UJ	**110 J**	4.7 UL	**1.3 J**	5.5 U	6 UL	5.2 U	6 UL	7.8 UL
Endosulfan sulfate	--	36.0	4.8 UJ	14 UJ	**35 J**	**14 J**	5.5 U	6 UL	5.2 U	6 UL	7.8 UL
Endrin	2.22	134	**17 J**	14 UJ	4.7 UL	4.4 UJ	5.5 U	6 UL	5.2 U	6 UL	7.8 UL
Endrin aldehyde	2.22	134	**3.3 J**	14 UJ	**4.2 J**	4.4 UJ	5.5 U	6 UL	5.2 U	6 UL	7.8 UL
gamma-Chlordane	3.24	18,690	2.5 UJ	**11 J**	**1.1 L**	**2.1 J**	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL
Heptachlor	--	454	2.5 UJ	7.1 UJ	2.4 UL	**0.69 J**	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL
Heptachlor epoxide	2.47	454	2.5 UJ	7.1 UJ	2.4 UL	2.3 UJ	2.8 U	3.1 UL	2.7 U	3.1 UL	4 UL
Methoxychlor	--	127	25 UJ	71 UJ	24 UL	23 UJ	28 U	31 UL	27 U	31 UL	40 UL
Explosives (UG/KG)											
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)											
Aluminum	25,500	--	**17,800**	**15,000**	**6,490**	**5,090**	**8,340 L**	**6,070 L**	**5,950 L**	**4,210 L**	**4,070 L**
Antimony	3.00	--	**0.5 L**	**2.2 L**	0.79 UL	0.86 UL	1.7 B	0.67 U	0.62 U	0.65 U	0.65 U
Arsenic	9.79	--	**17.9 K**	**43.6 L**	**6.8 K**	**7.4 K**	**12.2 L**	**4.5**	**3.2**	**8.8**	**7.2**

Table B-21
Exceedances - Upstream Pond Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04	
Sample ID			CAA03-SD01-1209A	CAA03-SD02-1209A	CAA03-SD03-1209A	CAA03-SD04-1209A	CAS004-4-SED01-00-1199	CAS004-4-SD02-00-1199	CAS004-4-SD03-00-1199	CAS004-4-SD04-00-1199	CAS004-4-SD04-00D-1199
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99	11/13/99
Barium	20.0	--	**56**	**118**	**21.6**	**80.1**	**71.7 J**	**27.1 J**	**24.9 J**	**27.5 J**	**23.6 J**
Beryllium	--	--	**0.98**	**0.87 J**	**0.4 J**	**0.3 J**	0.73 B	**0.56 J**	**0.6 J**	**0.36 J**	**0.22 J**
Cadmium	0.99	--	**0.45**	**2.9**	**0.6**	**0.46**	**5.7**	**3.2**	**2.9**	**0.79 J**	**0.52 J**
Chromium	43.4	--	**43.1 K**	**29.2 L**	**12.7 K**	**8.9 K**	**35.8**	**17.9**	**17.2**	**9.5**	**7.7**
Cobalt	50.0	--	**3.6 J**	**3.2 J**	**1.8 J**	**1.3 J**	**4.6 J**	**3.9 J**	**2.9 J**	1.8 U	1.8 U
Copper	31.6	--	**4.1**	**85.3 J**	**26.3**	**7.6**	**30.7**	**62.7 J**	**65.3 J**	**33.5 J**	**21.2 J**
Iron	20,000	--	**24,700 J**	**23,900**	**9,860 J**	**6,910 J**	**15,400**	**14,300 L**	**14,100**	**9,410 L**	**8,490 L**
Lead	35.8	--	**13.5**	**41.8**	**15.9**	**230**	**52.3**	**24.6**	**20.3**	**20.6**	**16**
Manganese	460	--	**37.3 J**	**119**	**59.1 J**	**17.3 J**	**62**	**93.4**	**74.9**	**72.7**	**60**
Mercury	0.18	--	**0.03 J**	**0.14**	**0.02 J**	**0.02 J**	**0.07 J**	0.04 UL	0.03 UL	0.04 UL	**0.04 L**
Nickel	22.7	--	**10.7**	**13.4**	**4**	**3.3 J**	**23.6**	**7.9 J**	**7.3 J**	**5 J**	**4.5 J**
Selenium	2.00	--	0.43 B	**1.4 J**	0.36 B	0.24 B	1.1 U	0.91 U	0.84 U	0.89 U	0.88 U
Silver	1.00	--	**0.15 J**	4.1 U	**0.2 J**	**0.15 J**	5.6 B	5.1 B	3.9 B	2.8 B	2 B
Thallium	--	--	**0.53 J**	4.1 U	1.5 U	1.6 U	0.91 UL	0.73 UL	0.67 UL	0.71 UL	0.71 UL
Vanadium	57.0	--	**53.8 K**	**38.1**	**17.2 K**	**12.3 K**	**36.6**	**21.9**	**21.1**	**15.1**	**13.2 J**
Zinc	121	--	**29.6 K**	**207**	**89.7 K**	**60 K**	**147**	**145**	**130**	**228**	**180**
Other Parameters											
pH	--	--	**7.6**	**6.2**	**6.9**	**6.8**	NA	NA	NA	NA	NA
Total organic carbon (TOC) (MG/KG)	--	--	**43,000**	**250,000**	**60,000**	**38,000**	NA	NA	NA	NA	NA

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Exceeds EqP

Table B-21
Exceedances - Upstream Pond Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Sediment Screening Value	EqP Value	CAS04-SD01		CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAS04-SD01-1209A	CAS04-SD01P-1209A	CAS04-SD02-1209A	CAS04-SD03-1209A	CAS04-SD04-1209A
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Volatile Organic Compounds (UG/KG)							
2-Butanone	--	1,802	26 UJ	31 UJ	42 UJ	37 UJ	21 J
Acetone	--	--	210 J	33 B	34 B	13 B	100 J
Carbon disulfide	--	5.67	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Ethylbenzene	--	24,030	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Methyl acetate	--	--	9 UJ	11 UJ	15 UJ	13 UJ	10 R
Methylcyclohexane	--	--	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Tetrachloroethene	--	3,538	5 UJ	11 J	8 J	28 J	42 J
Toluene	--	4,472	5 UJ	6 UJ	8 UJ	7 UJ	6 UJ
Xylene, total	--	1,068	16 UJ	19 UJ	26 UJ	22 UJ	16 UJ
Semivolatile Organic Compounds (UG/KG)							
2-Methylnaphthalene	70.0	--	25 UL	24 UL	34 UL	4 L	25 UL
Acenaphthene	290	4,139	25 U	24 U	2.9 J	4.3 J	7.9 J
Acenaphthylene	160	--	25 U	24 U	2.3 J	120	83 K
Anthracene	57.2	1,469	2.8 J	24 U	5.6 J	260	75 K
Benzo(a)anthracene	108	734	19 B	9 B	35 B	1,300	1,500
Benzo(a)pyrene	150	935	17 B	9 B	36	2,100	1,500
Benzo(b)fluoranthene	240	--	34 B	16 B	76	3,900	3,300
Benzo(g,h,i)perylene	170	--	25 UL	24 UL	7.1 B	1,900 L	490 J
Benzo(k)fluoranthene	240	--	12 B	6.3 B	24 J	1,600	1,100
bis(2-Ethylhexyl)phthalate	750	5,940,750	120 U	120 U	170 U	120 J	130 U
Carbazole	140	--	5 B	24 U	8.6 B	31	49 K
Chrysene	166	--	18 J	9.2 J	35	2,700	1,900
Dibenz(a,h)anthracene	33.0	--	25 U	24 U	34 U	660	320 K
Di-n-butylphthalate	110	73,425	120 U	120 U	170 U	72 J	130 U
Fluoranthene	423	19,358	42	22 J	72	320	1,800
Fluorene	77.4	3,605	25 U	24 U	34 U	14 B	12 B
Indeno(1,2,3-cd)pyrene	200	--	9.9 B	4.9 B	23 B	2,800	1,500
Naphthalene	176	3,204	25 U	24 U	34 U	6.6 J	25 U
PAH (HMW)	2,900	--	127	75.8	285	18,060	15,410
PAH (LMW)	786	--	140	118	190	835	2,209
PAH (total)	3,553	--	267	194	474	18,895	17,619
Pentachlorophenol	--	3,364	120 UL	120 UL	170 UL	150 UL	24 L
Phenanthrene	204	5,674	20 J	12 J	39	98	200 K
Pyrene	195	--	38	20 J	64	1,100	3,800
Pesticide/Polychlorinated Biphenyls (UG/KG)							
4,4'-DDD	4.88	734	2.6 B	4.1 U	5.6 U	380 J	310
4,4'-DDE	3.16	2,270	1.9 B	0.92 J	1.8 J	600 J	160 L
4,4'-DDT	4.16	2,270	2.7 B	2.1 J	5.6 U	1,600 J	55 J
Aldrin	2.00	--	2.4 UJ	2.1 U	2.9 U	2.7 UL	2.2 UJ
alpha-Chlordane	3.24	18,690	2.4 UJ	2.1 U	2.9 U	17 J	2.2 UJ
Aroclor-1248	59.8	6,675	27 UJ	24 U	32 U	300 U	25 U
Aroclor-1254	59.8	5,407	24 UJ	21 U	29 U	21,000	22 U
Aroclor-1260	59.8	5,407	30 J	25	200	280 U	50 K
Dieldrin	1.90	347	4.6 UJ	4.1 U	1.8 J	1,400 J	47 K
Endosulfan I	--	19.4	2.4 UJ	2.1 U	1.7 J	58 L	2.2 UJ
Endosulfan II	--	93.5	4.6 UJ	4.1 U	5.6 U	830 J	4.3 UJ
Endosulfan sulfate	--	36.0	4.6 UJ	4.1 U	5.6 U	5.2 UL	4.3 UJ
Endrin	2.22	134	4.6 UJ	4.1 U	9.6	1,200	4.3 UJ
Endrin aldehyde	2.22	134	4.6 UJ	4.1 U	5.6 U	290 J	4.3 UJ
gamma-Chlordane	3.24	18,690	2.4 UJ	2.1 U	2 J	780 J	14 L
Heptachlor	--	454	2.4 UJ	2.1 U	2.9 U	2.7 UL	2.2 UJ
Heptachlor epoxide	2.47	454	2.4 UJ	2.1 U	2.9 U	540 J	2.2 UJ
Methoxychlor	--	127	24 UJ	21 U	29 U	520 J	22 UJ
Explosives (UG/KG)							
No Detections	--	--	NA	NA	NA	NA	NA
Inorganics (MG/KG)							
Aluminum	25,500	--	5,440	5,150	5,560	20,400	11,800
Antimony	3.00	--	0.83 UL	0.72 UL	1.3 UL	2 L	0.83 UL
Arsenic	9.79	--	3.5 K	2.7 K	3.5 K	8.6 K	4.5 K

Table B-21
Exceedances - Upstream Pond Surface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAS04-SD01		CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAS04-SD01-1209A	CAS04-SD01P-1209A	CAS04-SD02-1209A	CAS04-SD03-1209A	CAS04-SD04-1209A
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Barium	20.0	--	**11.7**	**9.9**	**25.3**	**80.8**	**166**
Beryllium	--	--	**0.25 J**	**0.22 J**	**0.28 J**	**0.78**	**0.49 J**
Cadmium	0.99	--	**0.11**	**0.07 J**	**0.39**	**4.7**	**0.24**
Chromium	43.4	--	**11.1 K**	**9.8 K**	**9.6 K**	**49.7 K**	**17 K**
Cobalt	50.0	--	**0.97 J**	**0.83 J**	**1.2 J**	**5.1 J**	**2.5 J**
Copper	31.6	--	**3.3**	**2.6**	**11.1**	**142**	**6.9**
Iron	20,000	--	**7,430 J**	**6,370 J**	**7,030 J**	**25,900 J**	**12,600 J**
Lead	35.8	--	**9.2**	**6.8**	**17.2**	**417**	**200**
Manganese	460	--	**14.8 J**	**14.2 J**	**43.2 J**	**140 J**	**101 J**
Mercury	0.18	--	**0.02 J**	**0.02 J**	**0.05 J**	**0.62**	**0.01 J**
Nickel	22.7	--	**2.2 J**	**2.1 J**	**3.5 J**	**16.6**	**4.4**
Selenium	2.00	--	0.44 B	0.36 B	0.67 B	0.57 B	0.31 B
Silver	1.00	--	**0.16 J**	**0.16 J**	**0.18 J**	**6.1**	**0.14 J**
Thallium	--	--	1.6 U	1.3 U	2.5 U	1.7 U	**0.15 J**
Vanadium	57.0	--	**14.6 K**	**12.8 K**	**14.7 K**	**37.6 K**	**24.2 K**
Zinc	121	--	**11.8 K**	**9.7 K**	**32.1 K**	**475 K**	**56.2 K**
Other Parameters							
pH	--	--	**6.3**	**6.9**	**7.7**	**7.6**	**7.1**
Total organic carbon (TOC) (MG/KG)	--	--	**25,000**	**17,000**	**62,000**	**40,000**	**16,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Exceeds EqP

Table B-22
Ecological Screening Statistics - Upstream Pond Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Volatile Organic Compounds (UG/KG)																						
1,2-Dichlorobenzene	6.00 - 600	1 / 12	2.00	2.00	CAS04-SD04-1209B	84.1	122	147	12.9	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	896	0 / 12	0.002	--	--	NO
1,4-Dichlorobenzene	6.00 - 600	1 / 12	6.00	6.00	CAS04-SD04-1209B	84.4	121	147	14.1	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	922	0 / 12	0.01	--	--	NO
2-Butanone	7.00 - 35.0	3 / 12	9.00	110	CAA03-SD02-1209B	19.7	28.8	34.7	12.7	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	711	0 / 12	0.15	--	--	NO
4-Methyl-2-pentanone	14.9 - 37.0	1 / 12	2.00	2.00	CAS004-4-SD03-01-1199	13.0	5.16	15.7	11.4	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	84.3	0 / 12	0.02	--	--	NO
Acetone	11.0 - 64.0	3 / 12	88.0	420	CAA03-SD02-1209B	69.3	123	133	24.8	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Methyl acetate	11.0 - 13.0	1 / 8	4.00	4.00	CAA03-SD04-1209B	5.63	0.74	6.12	5.58	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Methylcyclohexane	6.00 - 7.00	1 / 8	2.00	2.00	CAA03-SD02-1209B	2.94	0.42	3.22	2.91	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Tetrachloroethene	13.9 - 16.9	8 / 12	8.00	42.0	CAA03-SD01-1209B	14.0	10.1	19.2	11.9	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	1,397	0 / 12	0.03	--	--	NO
Semivolatile Organic Compounds (UG/KG)																						
Acenaphthene	23.0 - 600	2 / 12	2.60	90.0	CAA03-SD02-1209B	96.0	115	156	34.6	290	0 / 12	0.31	NO	--	--	NO	1,634	0 / 12	0.06	--	--	NO
Acenaphthylene	23.0 - 600	2 / 12	8.90	15.0	CAS04-SD03-1209B	90.6	117	151	33.9	160	0 / 12	0.09	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Anthracene	24.0 - 600	6 / 12	2.20	33.0	CAA03-SD02-1209B	90.7	117	151	25.7	57.2	0 / 12	0.58	NO	--	--	NO	580	0 / 12	0.06	--	--	NO
Benzo(a)anthracene	12.0 - 410	6 / 12	110	230	CAS004-4-SD02-01-1199	97.2	84.2	141	48.6	108	6 / 12	2.13	**YES**	1.30	0.90	NO	290	0 / 12	0.79	--	--	NO
Benzo(a)pyrene	12.0 - 410	7 / 12	28.0	240	CAS004-4-SD02-01-1199	98.4	87.4	144	51.3	150	2 / 12	1.60	**YES**	0.96	0.66	NO	369	0 / 12	0.65	--	--	NO
Benzo(b)fluoranthene	23.0 - 46.0	6 / 12	57.0	510	CAS04-SD03-1209B	125	160	207	51.1	240	2 / 12	2.13	**YES**	0.86	0.52	NO	NSV	-- / --	NSV	NSV	NSV	NO
Benzo(g,h,i)perylene	9.80 - 600	4 / 12	29.0	100	CAS004-4-SD02-01-1199	71.1	93.1	119	32.3	170	0 / 12	0.59	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
Benzo(k)fluoranthene	9.90 - 410	5 / 12	52.0	280	CAS004-4-SD02-01-1199	79.0	91.8	127	33.6	240	1 / 12	1.17	**YES**	0.53	0.33	NO	NSV	-- / --	NSV	NSV	NSV	NO
bis(2-Ethylhexyl)phthalate	110 - 150	6 / 12	59.0	120	CAS004-4-SED01-01-1199	71.8	17.0	80.6	70.3	750	0 / 12	0.16	NO	--	--	NO	2,345,150	0 / 12	0.0001	--	--	NO
Butylbenzylphthalate	380 - 600	1 / 12	140	140	CAS04-SD03-1209B	218	40.1	239	214	28,985	0 / 12	0.005	NO	--	--	NO	28,985	0 / 12	0.005	--	--	NO
Chrysene	24.0 - 24.0	11 / 12	3.30	330	CAS004-4-SD02-01-1199	112	115	171	53.8	166	3 / 12	1.99	**YES**	1.03	0.67	NO	NSV	-- / --	NSV	NSV	NSV	NO
Dibenz(a,h)anthracene	6.40 - 600	2 / 12	45.0	84.0	CAS04-SD03-1209B	98.2	113	157	38.7	33.0	2 / 12	2.55	**YES**	4.76	2.98	**NO[3]**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
Di-n-butylphthalate	110 - 410	4 / 12	61.0	110	CAS04-SD03-1209B	81.0	41.8	103	74.9	110	1 / 12	1.00	**YES**	0.93	0.74	NO	28,985	0 / 12	0.004	--	--	NO
Fluoranthene	-- - --	12 / 12	4.70	520	CAS004-4-SD02-01-1199	148	150	226	72.9	423	1 / 12	1.23	**YES**	0.53	0.35	NO	7,642	0 / 12	0.07	--	--	NO
Fluorene	23.0 - 600	1 / 12	180	180	CAA03-SD02-1209B	104	117	165	41.8	77.4	1 / 12	2.33	**YES**	2.13	1.35	**NO[3]**	1,423	0 / 12	0.13	--	--	NO
Indeno(1,2,3-cd)pyrene	7.10 - 600	5 / 12	64.0	370	CAS04-SD03-1209B	107	123	171	43.8	200	1 / 12	1.85	**YES**	0.86	0.54	NO	NSV	-- / --	NSV	NSV	NSV	NO
Naphthalene	23.0 - 600	1 / 12	53.0	53.0	CAA03-SD02-1209B	93.8	115	153	37.8	176	0 / 12	0.30	NO	--	--	NO	1,265	0 / 12	0.04	--	--	NO
PAH (HMW)	-- - --	12 / 12	81.3	2,335	CAS004-4-SD02-01-1199	943	859	1,388	496	2,900	0 / 12	0.81	NO	--	--	NO	NSV	-- / --	NSV	NSV	NSV	NO
PAH (LMW)	-- - --	12 / 12	91.1	2,430	CAS004-4-SED01-01-1199	890	980	1,398	422	786	5 / 12	3.09	**YES**	1.78	1.13	**NO[3]**	NSV	-- / --	NSV	NSV	NSV	**NO[3]**
PAH (total)	-- - --	12 / 12	172	4,740	CAS004-4-SD02-01-1199	1,833	1,717	2,723	964	3,553	2 / 12	1.33	**YES**	0.77	0.52	NO	NSV	-- / --	NSV	NSV	NSV	NO
Phenanthrene	410 - 410	11 / 12	2.40	240	CAS004-4-SD02-01-1199	84.8	90.6	132	37.2	204	2 / 12	1.18	**YES**	0.65	0.42	NO	2,240	0 / 12	0.11	--	--	NO
Pyrene	-- - --	12 / 12	4.60	470	CAS004-4-SD02-01-1199	157	143	231	76.7	195	4 / 12	2.41	**YES**	1.18	0.80	NO	NSV	-- / --	NSV	NSV	NSV	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																						
4,4'-DDD	1.30 - 6.00	3 / 12	21.0	260	CAS04-SD03-1209B	26.8	73.8	65.0	4.20	4.88	3 / 12	53.3	**YES**	13.3	5.48	**YES**	290	0 / 12	0.90	--	--	**YES[3]**
4,4'-DDE	0.97 - 4.90	4 / 12	4.40	270	CAS04-SD03-1209B	24.7	77.3	64.8	2.60	3.16	4 / 12	85.4	**YES**	20.5	7.83	**YES**	896	0 / 12	0.30	--	--	**YES[3]**
4,4'-DDT	0.89 - 6.00	4 / 12	19.0	740	CAS04-SD03-1209B	102	231	222	6.97	4.16	4 / 12	178	**YES**	53.3	24.5	**YES**	896	0 / 12	0.83	--	--	**YES[3]**
alpha-Chlordane	2.00 - 3.10	2 / 12	2.60	6.00	CAS04-SD03-1209B	1.68	1.43	2.42	1.41	3.24	1 / 12	1.85	**YES**	0.75	0.52	NO	7,378	0 / 12	0.001	--	--	NO
Aroclor-1248	23.0 - 120	1 / 12	33.0	33.0	CAS004-4-SD02-01-1199	21.4	14.3	28.8	18.4	59.8	0 / 12	0.55	NO	--	--	NO	2,635	0 / 12	0.01	--	--	NO
Aroclor-1254	20.0 - 60.0	1 / 12	8,900	8,900	CAS04-SD03-1209B	756	2,565	2,086	25.2	59.8	1 / 12	149	**YES**	34.9	12.6	**YES**	2,134	1 / 12	4.17	0.98	0.35	**YES[3]**
Aroclor-1260	22.0 - 120	9 / 12	7.90	580	CAA03-SD02-1209B	103	164	188	44.8	59.8	4 / 12	9.70	**YES**	3.14	1.73	**YES**	2,134	0 / 12	0.27	--	--	NO
Dieldrin	4.10 - 6.00	2 / 12	3.40	600	CAS04-SD03-1209B	52.2	173	142	3.76	1.90	2 / 12	316	**YES**	74.5	27.5	**YES**	137	1 / 12	4.38	1.03	0.38	**YES[3]**
Endosulfan I	2.00 - 3.10	1 / 12	23.0	23.0	CAS04-SD03-1209B	2.98	6.31	6.25	1.48	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	7.64	1 / 12	3.01	0.82	0.39	**YES[3]**
Endosulfan II	4.10 - 6.00	3 / 12	0.86	360	CAS04-SD03-1209B	32.0	103	85.5	3.20	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	36.9	1 / 12	9.76	2.32	0.87	**YES[3]**
Endosulfan sulfate	4.10 - 6.00	1 / 12	3.20	3.20	CAS04-SD04-1209B	2.36	0.37	2.56	2.34	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	14.2	0 / 12	0.22	--	--	NO
Endrin	4.00 - 6.00	3 / 12	39.0	520	CAS04-SD03-1209B	51.9	148	129	5.74	2.22	3 / 12	234	**YES**	58.0	23.4	**YES**	52.7	1 / 12	9.87	2.44	0.98	**YES[3]**
Endrin aldehyde	4.00 - 6.00	1 / 12	140	140	CAS04-SD03-1209B	13.8	39.8	34.4	3.18	2.22	1 / 12	63.1	**YES**	15.5	6.19	**YES**	52.7	1 / 12	2.66	0.65	0.26	**YES[3]**
Endrin ketone	4.00 - 6.00	1 / 12	140	140	CAS04-SD03-1209B	13.8	39.8	34.4	3.18	2.22	1 / 12	63.1	**YES**	15.5	6.19	**YES**	52.7	1 / 12	2.66	0.65	0.26	**YES[3]**
gamma-Chlordane	2.10 - 3.10	3 / 12	0.75	340	CAS04-SD03-1209B	29.5	97.8	80.2	1.95	3.24	1 / 12	105	**YES**	24.8	9.11	**YES**	7,378	0 / 12	0.05	--	--	NO
Heptachlor epoxide	2.00 - 3.10	2 / 12	0.71	230	CAS04-SD03-1209B	20.2	66.1	54.5	1.74	2.47	1 / 12	93.1	**YES**	22.0	8.18	**YES**	179	1 / 12	1.28	0.30	0.11	**YES[3]**
Methoxychlor	20.0 - 31.0	1 / 12	230	230	CAS04-SD03-1209B	29.8	63.1	62.5	14.8	NSV	-- / --	NSV	**YES**	NSV	NSV	**YES**	50.1	1 / 12	4.59	1.25	0.60	**YES[3]**
Inorganics (MG/KG)																						
Aluminum	-- - --	12 / 12	1,500	25,700	CAS04-SD01-1209B	9,860	7,715	13,860	7,228	25,500	1 / 12	1.01	**YES**	0.54	0.39	NO	--	-- / --	--	--	--	--

Table B-22
Ecological Screening Statistics - Upstream Pond Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?	EqP Value	Frequency of EqP Exceedance	Maximum Hazard Quotient - EqP	95% UCL Hazard Quotient - EqP	Mean Hazard Quotient - EqP	Refined COPC Considering Bioavailability?
Antimony	0.43 - 0.91	6 / 12	0.10	1.20	CAS04-SD03-1209B	0.47	0.34	0.64	0.36	3.00	0 / 12	0.40	NO	--	--	NO	--	-- / --	--	--	--	--
Arsenic	-- - --	12 / 12	0.98	14.6	CAS04-SD01-1209B	7.37	4.69	9.80	5.52	9.79	3 / 12	1.49	**YES**	1.00	0.75	NO	--	-- / --	--	--	--	--
Barium	6.40 - 9.90	10 / 12	12.5	132	CAS04-SD04-1209B	37.0	34.6	54.9	24.6	20.0	8 / 12	6.60	**YES**	2.75	1.85	**YES**	--	-- / --	--	--	--	--
Beryllium	0.49 - 0.49	11 / 12	0.21	1.00	CAA03-SD03-1209B	0.47	0.27	0.61	0.41	NSV	-- / --	NSV	**YES**	NSV	NSV	**NO**[3]	--	-- / --	--	--	--	--
Cadmium	-- - --	12 / 12	0.050	7.20	CAS004-4-SED01-01-1199	1.13	2.11	2.22	0.31	0.99	3 / 12	7.27	**YES**	2.24	1.14	**YES**	--	-- / --	--	--	--	--
Calcium [2]	-- - --	12 / 12	1,000	15,200	CAS004-4-SD04-01-1199	4,402	4,051	6,502	3,141	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Chromium	-- - --	12 / 12	7.00	49.0	CAS04-SD01-1209B	20.6	15.0	28.4	16.1	43.4	1 / 12	1.13	**YES**	0.65	0.47	NO	--	-- / --	--	--	--	--
Cobalt	1.20 - 1.50	9 / 12	0.76	4.10	CAS04-SD01-1209B	2.15	1.42	2.88	1.68	50.0	0 / 12	0.08	NO	--	--	NO	--	-- / --	--	--	--	--
Copper	3.80 - 7.30	9 / 12	2.80	63.9	CAS04-SD03-1209B	11.7	17.5	20.8	6.34	31.6	1 / 12	2.02	**YES**	0.66	0.37	NO	--	-- / --	--	--	--	--
Iron	-- - --	12 / 12	4,540	34,000	CAA03-SD03-1209B	13,721	10,791	19,315	10,543	20,000	3 / 12	1.70	**YES**	0.97	0.69	NO	--	-- / --	--	--	--	--
Lead	-- - --	12 / 12	4.20	235	CAS04-SD03-1209B	45.7	70.2	82.1	20.6	35.8	3 / 12	6.56	**YES**	2.29	1.28	**YES**	--	-- / --	--	--	--	--
Magnesium [2]	-- - --	12 / 12	410	3,170	CAA03-SD03-1209B	1,311	934	1,795	1,042	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Manganese	-- - --	12 / 12	12.1	92.4	CAS04-SD03-1209B	32.0	21.2	42.9	27.4	460	0 / 12	0.20	NO	--	--	NO	--	-- / --	--	--	--	--
Mercury	0.020 - 0.040	8 / 12	0.010	0.18	CAS04-SD03-1209B	0.036	0.047	0.060	0.024	0.18	1 / 12	1.00	**YES**	0.34	0.20	NO	--	-- / --	--	--	--	--
Nickel	-- - --	12 / 12	1.70	22.9	CAS04-SD03-1209B	7.32	6.88	10.9	5.06	22.7	1 / 12	1.01	**YES**	0.48	0.32	NO	--	-- / --	--	--	--	--
Potassium [2]	272 - 272	11 / 12	346	4,390	CAA03-SD03-1209B	1,252	1,196	1,872	858	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Silver	0.97 - 2.30	6 / 12	0.070	3.10	CAS04-SD03-1209B	0.74	0.83	1.17	0.43	1.00	1 / 12	3.10	**YES**	1.17	0.74	NO	--	-- / --	--	--	--	--
Sodium [2]	27.2 - 162	1 / 12	57.0	57.0	CAS004-4-SD02-01-1199	38.0	23.1	50.0	32.0	NSV	-- / --	--	NO	--	--	NO	--	-- / --	--	--	--	--
Thallium	0.47 - 1.80	2 / 12	0.39	0.52	CAS04-SD01-1209B	0.55	0.23	0.67	0.50	NSV	-- / --	NSV	**YES**	NSV	NSV	**NO**[3]	--	-- / --	--	--	--	--
Vanadium	-- - --	12 / 12	6.80	64.3	CAS04-SD01-1209B	24.8	18.3	34.3	19.4	57.0	1 / 12	1.13	**YES**	0.60	0.44	NO	--	-- / --	--	--	--	--
Zinc	30.2 - 87.6	9 / 12	13.5	325	CAS04-SD03-1209B	79.9	112	138	41.6	121	2 / 12	2.69	**YES**	1.14	0.66	NO	--	-- / --	--	--	--	--
Other Parameters																						
pH --	- --	8 / 8	6.10	8.20	CAS04-SD03-1209B	7.15	0.69	7.61	7.12	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	8 / 8	6,500	71,000	CAA03-SD02-1209B	26,350	21,044	40,446	20,116	--	-- / --	--	--	--	--	--	--	-- / --	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-23
Exceedances - Upstream Pond Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04
Sample ID			CAA03-SD01-1209B	CAA03-SD02-1209B	CAA03-SD03-1209B	CAA03-SD04-1209B	CAS004-4-SED01-01-1199	CAS004-4-SD02-01-1199	CAS004-4-SD03-01-1199	CAS004-4-SD04-01-1199
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99
Volatile Organic Compounds (UG/KG)										
1,2-Dichlorobenzene	--	896	7 U	7 UJ	6 U	6 UJ	600 U	470 U	410 U	490 U
1,4-Dichlorobenzene	--	922	7 U	7 UJ	6 U	6 UJ	600 U	470 U	410 U	490 U
2-Butanone	--	711	35 U	**110 J**	30 U	**13 J**	7 B	14.9 U	13.9 U	16.0 U
4-Methyl-2-pentanone	--	84.3	35 U	37 UJ	30 U	32 UJ	16.9 U	14.9 U	**2 J**	16.0 U
Acetone	--	--	12 B	**420 J**	60 B	**88 J**	26 B	27 B	24 B	22 B
Methyl acetate	--	--	12 U	13 UJ	11 U	**4 J**	NA	NA	NA	NA
Methylcyclohexane	--	--	7 U	**2 J**	6 U	6 UJ	NA	NA	NA	NA
Tetrachloroethene	--	1,397	**42**	**23 J**	**9**	**8 J**	16.9 U	14.9 U	13.9 U	16.0 U
Semivolatile Organic Compounds (UG/KG)										
Acenaphthene	290	1,634	27 U	**90**	23 U	24 U	600 U	470 U	410 U	490 U
Acenaphthylene	160	--	27 U	31 U	23 U	24 U	600 U	470 U	410 U	490 U
Anthracene	57.2	580	**4 J**	**33**	**2.2 J**	24 U	600 U	470 U	410 U	490 U
Benzo(a)anthracene	108	290	28 B	**120**	15 B	24 U	**150 J**	**230 J**	410 U	**110 J**
Benzo(a)pyrene	150	369	**28**	**110**	16 B	24 U	**110 J**	**240 J**	410 U	**130 J**
Benzo(b)fluoranthene	240	--	46 B	**200**	32 B	24 U	**100 J**	**330 J**	**57 J**	**210 J**
Benzo(g,h,i)perylene	170	--	9.8 B	**29 J**	23 UL	24 UL	600 U	**100 J**	410 U	**60 J**
Benzo(k)fluoranthene	240	--	18 B	**52**	12 B	24 U	**86 J**	**280 J**	410 U	**130 J**
bis(2-Ethylhexyl)phthalate	750	2,345,150	140 U	150 U	120 U	**67 J**	**120 J**	**79 J**	**68 J**	**78 J**
Butylbenzylphthalate	--	28,985	450 U	510 U	390 U	400 U	600 U	470 U	410 U	490 U
Chrysene	166	--	**34**	**130**	**17 J**	24 U	**180 J**	**330 J**	**52 J**	**160 J**
Dibenz(a,h)anthracene	33.0	--	6.4 B	**45 J**	23 U	24 U	600 U	470 U	410 U	490 U
Di-n-butylphthalate	110	28,985	140 U	150 U	120 U	120 U	**61 J**	**62 J**	410 U	**84 J**
Fluoranthene	423	7,642	**49**	**250**	**42**	**5 J**	**230 J**	**520**	**87 J**	**250 J**
Fluorene	77.4	1,423	27 U	**180**	23 U	24 U	600 U	470 U	410 U	490 U
Indeno(1,2,3-cd)pyrene	200	--	31 B	**110**	9.1 B	24 U	600 U	**120 J**	410 U	**64 J**
Naphthalene	176	1,265	27 U	**53**	23 U	24 U	600 U	470 U	410 U	490 U
PAH (HMW)	2,900	--	**219**	**986**	**115**	**101**	**1,776**	**2,335**	**1,423**	**1,359**
PAH (LMW)	786	--	**168**	**863**	**131**	**94.7**	**2,430**	**2,405**	**1,727**	**2,105**
PAH (total)	3,553	--	**387**	**1,849**	**246**	**196**	**4,206**	**4,740**	**3,150**	**3,464**
Phenanthrene	204	2,240	**34**	**210**	**18 J**	**5.7 J**	**100 J**	**240 J**	410 U	**140 J**
Pyrene	195	--	**87**	**190**	**33**	**4.8 J**	**250 J**	**470**	**84 J**	**250 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	4.88	290	4.5 UJ	**21 J**	2 B	1.3 B	6 U	4.6 U	4.1 U	4.9 UL
4,4'-DDE	3.16	896	1 B	**4.8 J**	1.3 B	1.3 B	**6.6**	4.6 U	4.1 U	4.9 UL
4,4'-DDT	4.16	896	4.5 UJ	**19 J**	2.1 B	0.89 B	6 U	**49 J**	**400 D**	4.9 UL
alpha-Chlordane	3.24	7,378	2.3 UJ	**2.6 J**	2.1 UJ	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL
Aroclor-1248	59.8	2,635	26 UJ	29 U	24 UL	24 UJ	60 U	**33 J**	41 U	49 UL
Aroclor-1254	59.8	2,134	23 UJ	26 U	21 UL	21 UJ	60 U	46 U	41 U	49 UL
Aroclor-1260	59.8	2,134	**72 J**	**580**	**16 L**	22 UJ	60 U	**210**	**170**	**18 JP**
Dieldrin	1.90	137	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL
Endosulfan I	--	7.64	2.3 UJ	2.5 UJ	2.1 UJ	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL
Endosulfan II	--	36.9	4.5 UJ	**2.3 J**	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL
Endosulfan sulfate	--	14.2	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL
Endrin	2.22	52.7	**39 J**	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL
Endrin aldehyde	2.22	52.7	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL
Endrin ketone	2.22	52.7	4.5 UJ	4.8 UJ	4.1 UJ	4.1 UJ	6 U	4.6 U	4.1 U	4.9 UL
gamma-Chlordane	3.24	7,378	2.3 UJ	**3 J**	2.1 UJ	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL
Heptachlor epoxide	2.47	179	2.3 UJ	2.5 UJ	**0.71 J**	2.1 UJ	3.1 U	2.4 U	2.1 U	2.5 UL
Methoxychlor	--	50.1	23 UJ	25 UJ	21 UJ	21 UJ	31 U	24 U	21 U	25 UL
Explosives (UG/KG)										
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA

Table B-23
Exceedances - Upstream Pond Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAA03-SD01	CAA03-SD02	CAA03-SD03	CAA03-SD04	CAS004-4SD01	CAS004-4SD02	CAS004-4SD03	CAS004-4SD04
Sample ID			CAA03-SD01-1209B	CAA03-SD02-1209B	CAA03-SD03-1209B	CAA03-SD04-1209B	CAS004-4-SED01-01-1199	CAS004-4-SD02-01-1199	CAS004-4-SD03-01-1199	CAS004-4-SD04-01-1199
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	11/12/99	11/14/99	11/13/99	11/13/99
Inorganics (MG/KG)										
Aluminum	25,500	--	**10,300**	**6,100**	**20,600**	**13,500**	**5,120 L**	**2,780 L**	**1,500 L**	**3,370 L**
Antimony	3.00	--	**0.14 L**	0.76 B	**0.66 L**	0.72 UL	**1 J**	0.48 U	0.43 U	0.55 U
Arsenic	9.79	--	**7.7 K**	**14 L**	**9.1 K**	**7.5 K**	**11.2**	**1.9 J**	**0.98 J**	**9.5**
Barium	20.0	--	**32.2**	**38.5**	**28.3**	**46.6**	**39.2 J**	9.9 B	6.4 B	**19.2 J**
Beryllium	--	--	**0.52 J**	**0.34 J**	**1**	**0.45 J**	0.49 B	**0.27 J**	**0.21 J**	**0.31 J**
Cadmium	0.99	--	**0.33**	**1.3**	**0.14**	**0.05 J**	**7.2**	**0.15 J**	**0.85 J**	**0.09 J**
Chromium	43.4	--	**23.6 K**	**11.3 L**	**42.1 K**	**17.8 K**	**25**	**9.3**	**7.7**	**7**
Cobalt	50.0	--	**2 J**	**1.2 J**	**3.9 J**	**3 J**	**3.1 J**	1.3 U	1.2 U	1.5 U
Copper	31.6	--	**5**	**20.5 J**	**17.2**	**4.5**	**10.1**	3.8 B	7.3 B	5.1 B
Iron	20,000	--	**14,000 J**	**7,220**	**34,000 J**	**16,500 J**	**9,040**	**7,840 L**	**4,540 L**	**4,950 L**
Lead	35.8	--	**27.9**	**16.4**	**14.3**	**18.6**	**59.8**	**4.2**	**5.4**	**10.9**
Manganese	460	--	**31.8 J**	**31.2**	**34.8 J**	**23.2 J**	**26.8**	**14.5**	**12.1**	**36**
Mercury	0.18	--	**0.03 J**	**0.06**	**0.02 J**	**0.02 J**	0.04 U	0.02 UL	0.03 UL	0.03 UL
Nickel	22.7	--	**5.9**	**4.5**	**9.4 J**	**5.4**	**18.3**	**1.7 J**	**2 J**	**2.3 J**
Silver	1.00	--	**0.12 J**	1.3 U	**0.31 J**	**0.15 J**	2.1 B	2.3 B	1.5 B	0.97 U
Thallium	--	--	1.8 U	1.3 U	**0.39 J**	1.3 U	0.81 UL	0.52 UL	0.47 UL	0.6 UL
Vanadium	57.0	--	**30.4 K**	**14.7**	**51.4 K**	**28 K**	**25.4**	**9.6 J**	**6.8 J**	**9.8 J**
Zinc	121	--	**29 K**	**83.5**	**51.6 K**	**18.7 K**	87.6 B	30.2 B	44.4 B	**307**
Other Parameters										
pH	--	--	**7.1**	**6.5**	**6.1**	**6.9**	NA	NA	NA	NA
Total organic carbon (TOC) (MG/KG)	--	--	**40,000**	**71,000**	**6,500**	**7,300**	NA	NA	NA	NA

Notes:

Grey highlighting indicates value greater than screening value

Yellow highlighting indicates value equal to screening value

Bold indicates detections

NA - Not analyzed

Exceeds EqP

Table B-23
Exceedances - Upstream Pond Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Sediment Screening Value	EqP Value	CAS04-SD01		CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAS04-SD01-1209B	CAS04-SD01P-1209B	CAS04-SD02-1209B	CAS04-SD03-1209B	CAS04-SD04-1209B
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Volatile Organic Compounds (UG/KG)							
1,2-Dichlorobenzene	--	896	6 U	6 U	6 UJ	6 U	**2 J**
1,4-Dichlorobenzene	--	922	6 U	6 U	6 UJ	6 U	**6 J**
2-Butanone	--	711	28 U	30 U	32 UJ	31 U	**9 J**
4-Methyl-2-pentanone	--	84.3	28 U	30 U	32 UJ	31 U	33 UJ
Acetone	--	--	**190 J**	27 B	21 B	11 B	64 B
Methyl acetate	--	--	10 U	11 U	12 UJ	11 U	12 UJ
Methylcyclohexane	--	--	6 U	6 U	6 UJ	6 U	6 UJ
Tetrachloroethene	--	1,397	**14**	**17**	**13 J**	**9**	**16 J**
Semivolatile Organic Compounds (UG/KG)							
Acenaphthene	290	1,634	23 U	24 U	28 U	**2.6 J**	23 U
Acenaphthylene	160	--	23 U	24 U	28 U	**15 J**	**8.9 J**
Anthracene	57.2	580	23 U	24 U	**2.3 J**	**30**	**8.3 J**
Benzo(a)anthracene	108	290	23 U	2.7 B	12 B	**180**	**120 L**
Benzo(a)pyrene	150	369	23 U	24 U	12 B	**220**	**100 L**
Benzo(b)fluoranthene	240	--	23 U	24 U	26 B	**510**	23 U
Benzo(g,h,i)perylene	170	--	23 UL	24 UL	28 UL	**93 L**	23 UL
Benzo(k)fluoranthene	240	--	23 U	24 U	9.9 B	**140**	23 U
bis(2-Ethylhexyl)phthalate	750	2,345,150	110 U	120 U	140 U	**59 J**	110 U
Butylbenzylphthalate	--	28,985	380 U	390 U	460 U	**140 J**	380 U
Chrysene	166	--	23 U	**3.3 J**	**13 J**	**310**	**100 L**
Dibenz(a,h)anthracene	33.0	--	23 U	24 U	28 U	**84**	23 U
Di-n-butylphthalate	110	28,985	110 U	120 U	140 U	**110 J**	110 U
Fluoranthene	423	7,642	23 U	**4.7 J**	**30**	**140**	**170 L**
Fluorene	77.4	1,423	23 U	24 U	28 U	25 U	23 U
Indeno(1,2,3-cd)pyrene	200	--	23 U	24 U	7.1 B	**370**	**71**
Naphthalene	176	1,265	23 U	24 U	28 U	25 U	23 U
PAH (HMW)	2,900	--	104 U	**81.3**	**101**	**2,207**	**617**
PAH (LMW)	786	--	104 U	**91.1**	**130**	**276**	**256**
PAH (total)	3,553	--	207 U	**172**	**231**	**2,483**	**873**
Phenanthrene	204	2,240	23 U	**2.4 J**	**14 J**	**38**	**11 J**
Pyrene	195	--	23 U	**4.6 J**	**26 J**	**300**	**180 L**
Pesticide/Polychlorinated Biphenyls (UG/KG)							
4,4'-DDD	4.88	290	4.2 UJ	0.97 B	4.7 UJ	**260 J**	**22 J**
4,4'-DDE	3.16	896	4.2 UJ	0.73 B	0.97 B	**270 J**	**4.4 J**
4,4'-DDT	4.16	896	4.2 UJ	3.9 UJ	4.7 UJ	**740 J**	2.5 B
alpha-Chlordane	3.24	7,378	2.1 UJ	2 UJ	2.4 UJ	**6.0 J**	2 UJ
Aroclor-1248	59.8	2,635	24 UJ	22 UJ	27 UJ	120 UJ	23 UL
Aroclor-1254	59.8	2,134	21 UJ	20 UJ	24 UJ	**8,900 J**	20 UL
Aroclor-1260	59.8	2,134	23 UJ	**7.9 J**	**39 J**	120 UJ	**25 L**
Dieldrin	1.90	137	4.2 UJ	3.9 UJ	4.7 UJ	**600 J**	**3.4 J**
Endosulfan I	--	7.64	2.1 UJ	2 UJ	2.4 UJ	**23 J**	2 UJ
Endosulfan II	--	36.9	4.2 UJ	3.9 UJ	4.7 UJ	**360 J**	**0.86 J**
Endosulfan sulfate	--	14.2	4.2 UJ	3.9 UJ	4.7 UJ	4.3 UJ	**3.2 J**
Endrin	2.22	52.7	4.2 UJ	3.9 UJ	**43 J**	**520**	4 UJ
Endrin aldehyde	2.22	52.7	4.2 UJ	3.9 UJ	4.7 UJ	**140 J**	4 UJ
Endrin ketone	2.22	52.7	4.2 UJ	3.9 UJ	4.7 UJ	**140 J**	4 UJ
gamma-Chlordane	3.24	7,378	2.1 UJ	2 UJ	2.4 UJ	**340 J**	**0.75 J**
Heptachlor epoxide	2.47	179	2.1 UJ	2 UJ	2.4 UJ	**230 J**	2 UJ
Methoxychlor	--	50.1	21 UJ	20 UJ	24 UJ	**230 J**	20 UJ
Explosives (UG/KG)							
No Detections	--	--	NA	NA	NA	NA	NA

Table B-23
Exceedances - Upstream Pond Subsurface Sediment
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Sediment Screening Value**	**EqP Value**	CAS04-SD01		CAS04-SD02	CAS04-SD03	CAS04-SD04
Sample ID			CAS04-SD01-1209B	CAS04-SD01P-1209B	CAS04-SD02-1209B	CAS04-SD03-1209B	CAS04-SD04-1209B
Sample Date			12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Inorganics (MG/KG)							
Aluminum	25,500	--	**25,700**	**14,000**	**4,810**	**16,700**	**7,840**
Antimony	3.00	--	**0.56 L**	0.83 UL	0.91 UL	**1.2 L**	**0.1 L**
Arsenic	9.79	--	**14.6 K**	**7.9 K**	**2.3 K**	**7.4 K**	**2.2 K**
Barium	20.0	--	**24.1**	**17.6**	**12.5**	**63.2**	**132**
Beryllium	--	--	**0.87**	**0.51 J**	**0.22 J**	**0.76**	**0.5**
Cadmium	0.99	--	**0.14**	**0.12**	**0.11**	**3.1**	**0.07 J**
Chromium	43.4	--	**49 K**	**26.4 K**	**8.1 K**	**37.8 K**	**8.2 K**
Cobalt	50.0	--	**4.1 J**	**2.1 J**	**0.76 J**	**4.1 J**	**1.6 J**
Copper	31.6	--	**4.4**	**3.7**	**2.8**	**63.9**	**3.8**
Iron	20,000	--	**32,900 J**	**17,800 J**	**5,200 J**	**23,200 J**	**5,260 J**
Lead	35.8	--	**11.2**	**6.8**	**9.2**	**235**	**136**
Manganese	460	--	**27.4 J**	**17.6 J**	**13.1 J**	**92.4 J**	**40.1 J**
Mercury	0.18	--	**0.02 J**	**0.01 J**	**0.03 J**	**0.18**	**0.01 J**
Nickel	22.7	--	**10.2**	**5.4**	**1.9 J**	**22.9**	**3.3 J**
Silver	1.00	--	2.1 U	**0.14 J**	1.7 U	**3.1**	**0.07 J**
Thallium	--	--	**0.52 J**	1.6 U	1.7 U	1.5 U	1.3 U
Vanadium	57.0	--	**64.3 K**	**34.2 K**	**11.4 K**	**35.5 K**	**10.6 K**
Zinc	121	--	**27.7 K**	**17.1 K**	**13.5 K**	**325 K**	**21.2 K**
Other Parameters							
pH	--	--	**7.5**	**7.6**	**7.8**	**8.2**	**7**
Total organic carbon (TOC) (MG/KG)	--	--	**9,500**	**17,000**	**28,000**	**19,000**	**22,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Exceeds EqP

Table B-24
Hazard Quotients for Aquatic Food Web Exposures (Maximum) - Upstream Pond
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Raccoon			Mink			Muskrat			Marsh Wren			Belted Kingfisher			Great Blue Heron			Mallard		
	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL
Metals																					
Arsenic	9.55E-01	4.27E-01	1.91E-01	2.22E-01	9.94E-02	4.44E-02	1.93E+01	8.65E+00	3.87E+00	3.83E+00	2.21E+00	1.28E+00	3.86E-01	2.44E-01	1.55E-01	6.96E-02	4.41E-02	2.79E-02	1.05E+00	6.66E-01	4.22E-01
Cadmium	6.45E-01	2.88E-01	1.29E-01	6.00E-02	2.68E-02	1.20E-02	1.77E+00	5.59E-01	1.77E-01	3.57E+00	9.62E-01	2.59E-01	5.18E-01	1.40E-01	3.76E-02	4.17E-02	1.12E-02	3.02E-03	1.45E+00	3.92E-01	1.05E-01
Chromium	1.57E-01	7.01E-02	3.13E-02	2.78E-02	1.24E-02	5.56E-03	2.63E-01	1.18E-01	5.26E-02	7.52E+00	3.36E+00	1.50E+00	1.11E+00	4.98E-01	2.23E-01	1.22E-01	5.47E-02	2.45E-02	8.89E-01	3.97E-01	1.78E-01
Copper	1.43E+00	1.26E+00	1.11E+00	5.85E-02	5.14E-02	4.52E-02	1.23E-01	1.06E-01	9.20E-02	7.03E+00	6.14E+00	5.36E+00	8.59E-01	7.50E-01	6.54E-01	1.95E-02	1.71E-02	1.49E-02	4.85E-01	4.23E-01	3.69E-01
Lead	6.90E-01	2.18E-01	6.90E-02	1.76E-01	5.55E-02	1.76E-02	2.75E+00	8.71E-01	2.75E-01	1.19E+01	5.33E+00	2.38E+00	2.52E+00	1.13E+00	5.04E-01	4.90E-01	2.19E-01	9.80E-02	2.04E+01	6.44E+00	2.04E+00
Mercury	4.68E-01	3.63E-01	2.81E-01	9.11E-01	7.06E-01	5.47E-01	9.14E+00	4.09E+00	1.83E+00	2.02E+01	1.17E+01	6.75E+00	2.15E+01	1.24E+01	7.17E+00	7.06E+00	4.07E+00	2.35E+00	1.30E+01	7.51E+00	4.33E+00
Nickel	2.40E-02	1.52E-02	9.59E-03	4.54E-02	2.87E-02	1.82E-02	8.26E-02	5.84E-02	4.13E-02	2.36E-02	2.01E-02	1.71E-02	5.59E-02	4.75E-02	4.04E-02	1.97E-02	1.68E-02	1.42E-02	4.56E-02	3.88E-02	3.30E-02
Selenium	3.91E-01	3.05E-01	2.37E-01	3.37E-01	2.62E-01	2.04E-01	2.02E+00	1.57E+00	1.22E+00	1.07E+00	7.58E-01	5.36E-01	1.63E-01	7.29E-02	3.26E-02	5.03E-02	2.25E-02	1.01E-02	1.13E+00	7.96E-01	5.63E-01
Silver	5.35E-03	2.39E-03	1.07E-03	3.24E-02	1.45E-02	6.48E-03	8.74E-03	3.91E-03	1.75E-03	1.16E-02	5.18E-03	2.32E-03	3.12E-02	1.39E-02	6.24E-03	1.11E-02	4.95E-03	2.21E-03	1.66E-03	7.43E-04	3.32E-04
Zinc	2.05E+00	9.17E-01	4.10E-01	1.62E-01	7.23E-02	3.23E-02	5.28E-01	3.73E-01	2.64E-01	4.58E+01	1.52E+01	5.07E+00	6.07E+00	2.02E+00	6.72E-01	3.11E-01	1.04E-01	3.45E-02	8.01E+00	2.66E+00	8.86E-01
Polychlorinated Biphenyls																					
Aroclor-1248	4.55E-02	2.05E-02	9.22E-03	8.48E-02	3.82E-02	1.72E-02	5.02E-03	2.24E-03	1.00E-03	8.10E-02	3.62E-02	1.62E-02	3.82E-02	1.71E-02	7.65E-03	1.06E-02	4.75E-03	2.12E-03	3.62E-03	1.62E-03	7.24E-04
Aroclor-1254	4.91E+01	2.21E+01	9.96E+00	9.34E+01	4.21E+01	1.90E+01	3.47E+00	1.55E+00	6.94E-01	8.93E+01	3.99E+01	1.79E+01	4.22E+01	1.89E+01	8.43E+00	1.17E+01	5.23E+00	2.34E+00	3.84E+00	1.72E+00	7.68E-01
Aroclor-1260	2.80E+00	1.26E+00	5.69E-01	5.34E+00	2.40E+00	1.08E+00	1.72E-01	7.67E-02	3.43E-02	5.10E+00	2.28E+00	1.02E+00	2.41E+00	1.08E+00	4.82E-01	6.69E-01	2.99E-01	1.34E-01	2.17E-01	9.69E-02	4.34E-02
Pesticides																					
4,4'-DDD	5.71E-03	2.55E-03	1.14E-03	4.11E-02	1.84E-02	8.23E-03	1.35E-02	6.02E-03	2.69E-03	3.71E-01	1.66E-01	7.42E-02	5.16E-01	1.63E-01	5.16E-02	1.84E-01	5.82E-02	1.84E-02	9.05E-02	4.05E-02	1.81E-02
4,4'-DDE	6.37E-02	2.85E-02	1.27E-02	7.56E-01	3.38E-01	1.51E-01	1.48E-02	6.62E-03	2.96E-03	4.96E+00	2.22E+00	9.92E-01	9.45E+00	2.99E+00	9.45E-01	3.38E+00	1.07E+00	3.38E-01	2.72E-01	1.22E-01	5.43E-02
4,4'-DDT	8.69E-02	3.89E-02	1.74E-02	6.78E-01	3.03E-01	1.36E-01	4.42E-02	1.98E-02	8.85E-03	1.81E+00	1.14E+00	7.23E-01	8.67E+00	2.74E+00	8.67E-01	3.03E+00	9.59E-01	3.03E-01	1.18E-01	7.48E-02	4.73E-02
Aldrin	1.34E-04	6.01E-05	2.69E-05	2.18E-04	9.74E-05	4.35E-05	1.59E-04	7.12E-05	3.18E-05	1.82E-03	8.16E-04	3.65E-04	1.22E-03	5.46E-04	2.44E-04	3.77E-04	1.68E-04	7.53E-05	2.23E-04	9.97E-05	4.46E-05
alpha-Chlordane	7.85E-05	5.55E-05	3.92E-05	1.79E-04	1.27E-04	8.96E-05	9.49E-05	6.71E-05	4.75E-05	2.44E-03	1.09E-03	4.88E-04	4.47E-03	2.00E-03	8.93E-04	1.38E-03	6.16E-04	2.75E-04	6.98E-04	3.12E-04	1.40E-04
Dieldrin	3.81E+00	1.71E+00	7.63E-01	2.41E+00	1.08E+00	4.81E-01	1.63E+00	7.29E-01	3.26E-01	2.63E+01	1.18E+01	5.26E+00	6.20E+00	2.77E+00	1.24E+00	1.17E+00	5.25E-01	2.35E-01	1.86E+00	8.31E-01	3.71E-01
Endosulfan I	2.29E-03	1.03E-03	4.59E-04	2.79E-03	1.25E-03	5.59E-04	6.41E-02	2.87E-02	1.28E-02	1.78E-03	7.95E-04	3.55E-04	1.22E-03	5.44E-04	2.43E-04	3.75E-04	1.68E-04	7.50E-05	1.08E-03	4.85E-04	2.17E-04
Endosulfan II	2.45E-02	1.10E-02	4.90E-03	3.99E-02	1.79E-02	7.99E-03	5.06E-01	2.26E-01	1.01E-01	2.54E-02	1.14E-02	5.08E-03	1.74E-02	7.78E-03	3.48E-03	5.36E-03	2.40E-03	1.07E-03	8.76E-03	3.92E-03	1.75E-03
Endrin	1.64E-01	7.34E-02	3.28E-02	3.14E-01	1.40E-01	6.28E-02	3.85E-01	1.72E-01	7.70E-02	1.22E+00	5.47E-01	2.45E-01	8.38E-01	3.75E-01	1.68E-01	2.58E-01	1.16E-01	5.17E-02	2.80E-01	1.25E-01	5.59E-02
gamma-Chlordane	3.51E-03	2.48E-03	1.75E-03	8.20E-03	5.80E-03	4.10E-03	4.23E-03	2.99E-03	2.11E-03	1.12E-01	4.99E-02	2.23E-02	2.04E-01	9.14E-02	4.09E-02	6.30E-02	2.82E-02	1.26E-02	3.15E-02	1.41E-02	6.30E-03
Heptachlor	1.20E-04	5.35E-05	2.39E-05	1.79E-04	8.01E-05	3.58E-05	1.52E-04	6.81E-05	3.05E-05	4.87E-04	2.18E-04	9.74E-05	3.25E-04	1.45E-04	6.49E-05	1.00E-04	4.48E-05	2.00E-05	6.72E-05	3.01E-05	1.34E-05
Heptachlor epoxide	6.90E-02	3.08E-02	1.38E-02	1.30E-01	5.81E-02	2.60E-02	1.67E-01	7.47E-02	3.34E-02	3.44E-01	1.54E-01	6.89E-02	2.36E-01	1.05E-01	4.71E-02	7.27E-02	3.25E-02	1.45E-02	8.22E-02	3.67E-02	1.64E-02
Methoxychlor	3.28E-03	2.32E-03	1.64E-03	6.26E-03	4.43E-03	3.13E-03	7.58E-03	5.36E-03	3.79E-03	4.49E-04	2.01E-04	8.98E-05	3.07E-04	1.37E-04	6.14E-05	9.47E-05	4.24E-05	1.89E-05	1.01E-04	4.52E-05	2.02E-05
Semivolatile Organics																					
Acenaphthene	4.44E-05	3.14E-05	2.22E-05	4.13E-05	2.92E-05	2.06E-05	1.31E-04	9.27E-05	6.56E-05	2.57E-02	1.15E-02	5.14E-03	1.03E-02	4.62E-03	2.07E-03	2.73E-03	1.22E-03	5.46E-04	7.83E-03	3.50E-03	1.57E-03
Acenaphthylene	1.68E-05	1.19E-05	8.40E-06	1.65E-05	1.17E-05	8.26E-06	4.49E-05	3.18E-05	2.25E-05	1.03E-02	4.60E-03	2.06E-03	4.13E-03	1.85E-03	8.27E-04	1.09E-03	4.89E-04	2.19E-04	2.72E-03	1.22E-03	5.45E-04
Anthracene	5.06E-06	2.26E-06	1.01E-06	1.25E-05	5.60E-06	2.50E-06	2.32E-05	1.04E-05	4.64E-06	3.45E-03	1.54E-03	6.91E-04	6.78E-03	3.03E-03	1.36E-03	2.37E-03	1.06E-03	4.73E-04	3.46E-03	1.55E-03	6.93E-04
Benzo(a)anthracene	2.07E-02	9.25E-03	4.14E-03	3.61E-02	1.61E-02	7.22E-03	2.76E-02	1.23E-02	5.52E-03	8.92E-02	3.99E-02	1.78E-02	4.71E-02	2.11E-02	9.42E-03	1.36E-02	6.10E-03	2.73E-03	1.06E-02	4.74E-03	2.12E-03
Benzo(a)pyrene	1.06E-02	4.76E-03	2.13E-03	5.05E-02	2.26E-02	1.01E-02	2.95E-02	1.32E-02	5.91E-03	2.10E-02	9.37E-03	4.19E-03	5.39E-02	2.41E-02	1.08E-02	1.91E-02	8.54E-03	3.82E-03	7.83E-03	3.50E-03	1.57E-03
Benzo(b)fluoranthene	2.16E-02	9.66E-03	4.32E-03	9.38E-02	4.20E-02	1.88E-02	7.46E-02	3.34E-02	1.49E-02	3.40E-02	1.52E-02	6.80E-03	9.96E-02	4.46E-02	1.99E-02	3.55E-02	1.59E-02	7.10E-03	2.05E-02	9.15E-03	4.09E-03
Benzo(g,h,i)perylene	9.96E-03	4.45E-03	1.99E-03	4.57E-02	2.04E-02	9.14E-03	1.93E-02	8.62E-03	3.85E-03	2.71E-02	1.21E-02	5.41E-03	4.97E-02	2.22E-02	9.95E-03	1.73E-02	7.73E-03	3.46E-03	5.10E-03	2.28E-03	1.02E-03
Benzo(k)fluoranthene	1.04E-02	4.66E-03	2.08E-03	3.85E-02	1.72E-02	7.70E-03	2.13E-02	9.53E-03	4.26E-03	3.10E-02	1.39E-02	6.21E-03	4.28E-02	1.92E-02	8.57E-03	1.46E-02	6.51E-03	2.91E-03	6.20E-03	2.77E-03	1.24E-03
Chrysene	1.78E-02	7.98E-03	3.57E-03	6.50E-02	2.91E-02	1.30E-02	4.96E-02	2.22E-02	9.93E-03	4.29E-02	1.92E-02	8.57E-03	7.12E-02	3.18E-02	1.42E-02	2.46E-02	1.10E-02	4.91E-03	1.43E-02	6.40E-03	2.86E-03
Dibenz(a,h)anthracene	3.42E-03	1.53E-03	6.84E-04	1.59E-02	7.10E-03	3.18E-03	7.15E-03	3.20E-03	1.43E-03	8.75E-03	3.92E-03	1.75E-03	1.72E-02	7.70E-03	3.44E-03	6.01E-03	2.69E-03	1.20E-03	1.89E-03	8.43E-04	3.77E-04
Fluoranthene	5.57E-05	2.49E-05	1.11E-05	1.73E-04	7.75E-05	3.47E-05	2.01E-04	8.99E-05	4.02E-05	2.69E-02	1.20E-02	5.38E-03	4.73E-02	2.11E-02	9.45E-03	1.64E-02	7.32E-03	3.28E-03	1.48E-02	6.61E-03	2.96E-03
Fluorene	2.94E-05	1.31E-05	5.88E-06	4.04E-05	1.81E-05	8.09E-06	1.00E-04	4.47E-05	2.00E-05	2.03E-02	9.10E-03	4.07E-03	1.27E-02	5.66E-03	2.53E-03	3.82E-03	1.71E-03	7.64E-04	8.12E-03	3.63E-03	1.62E-03
Indeno(1,2,3-cd)pyrene	1.57E-02	7.02E-03	3.14E-03	6.74E-02	3.01E-02	1.35E-02	2.77E-02	1.24E-02	5.54E-03	4.67E-02	2.09E-02	9.35E-03	7.41E-02	3.31E-02	1.48E-02	2.55E-02	1.14E-02	5.10E-03	7.57E-03	3.39E-03	1.51E-03
Pentachlorophenol	2.05E-03	9.16E-04	4.10E-04	1.07E-03	4.77E-04	2.13E-04	1.23E-02	5.50E-03	2.46E-03	7.98E-03	5.64E-03	3.99E-03	5.45E-03	3.85E-03	2.72E-03	1.68E-03	1.19E-03	8.40E-04	1.60E-02	1.13E-02	7.99E-03
Phenanthrene	2.06E-05	9.21E-06	4.12E-06	4.04E-05	1.81E-05	8.09E-06	7.49E-05	3.35E-05	1.50E-05	1.21E-02	5.42E-03	2.42E-03	1.17E-02	5.23E-03	2.34E-03	3.82E-03	1.71E-03	7.64E-04	5.85E-03	2.62E-03	1.17E-03
Pyrene	4.71E-02	2.11E-02	9.42E-03	9.14E-02	4.09E-02	1.83E-02	1.45E-01	6.47E-02	2.89E-02	1.33E-01	5.95E-02	2.66E-02	1.09E-01	4.86E-02	2.17E-02	3.46E-02	1.55E-02	6.91E-03	4.62E-02	2.07E-02	9.25E-03

Shaded cells indicate HQ > 1

Table B-25
Hazard Quotients for Aquatic Food Web Exposures (95% UCL) - Upstream Pond
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Raccoon			Mink			Muskrat			Marsh Wren			Belted Kingfisher			Great Blue Heron			Mallard		
	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL
Metals																					
Arsenic	4.63E-02	2.07E-02	9.25E-03	5.87E-02	2.63E-02	1.17E-02	4.25E-01	1.90E-01	8.50E-02	3.13E-01	1.81E-01	1.04E-01	5.16E-02	3.27E-02	2.07E-02	2.25E-02	1.42E-02	9.01E-03	1.26E-02	7.99E-03	5.06E-03
Cadmium	3.45E-02	1.55E-02	6.91E-03	2.15E-02	9.63E-03	4.31E-03	9.17E-02	2.90E-02	9.17E-03	1.93E-01	5.19E-02	1.40E-02	4.91E-02	1.32E-02	3.56E-03	1.83E-02	4.93E-03	1.33E-03	5.53E-02	1.49E-02	4.01E-03
Chromium	2.52E-02	1.13E-02	5.04E-03	1.16E-02	5.18E-03	2.32E-03	5.95E-02	2.66E-02	1.19E-02	**1.02E+00**	4.58E-01	2.05E-01	1.79E-01	7.99E-02	3.57E-02	6.24E-02	2.79E-02	1.25E-02	1.12E-01	5.00E-02	2.24E-02
Copper	4.67E-02	4.11E-02	3.61E-02	1.81E-02	1.59E-02	1.40E-02	8.31E-03	7.20E-03	6.23E-03	2.42E-01	2.11E-01	1.84E-01	3.46E-02	3.02E-02	2.63E-02	7.40E-03	6.46E-03	5.64E-03	1.40E-02	1.22E-02	1.07E-02
Lead	5.05E-02	1.60E-02	5.05E-03	4.64E-02	1.47E-02	4.64E-03	1.28E-01	4.04E-02	1.28E-02	**1.14E+00**	5.10E-01	2.28E-01	3.52E-01	1.58E-01	7.05E-02	1.58E-01	7.08E-02	3.17E-02	4.93E-01	1.56E-01	4.93E-02
Mercury	2.25E-02	1.75E-02	1.35E-02	1.31E-01	1.02E-01	7.87E-02	1.93E-01	8.64E-02	3.86E-02	**1.77E+00**	**1.02E+00**	5.90E-01	**2.42E+00**	**1.40E+00**	8.06E-01	**1.24E+00**	7.18E-01	4.14E-01	2.34E-01	1.35E-01	7.79E-02
Selenium	4.23E-02	3.29E-02	2.56E-02	9.90E-02	7.71E-02	6.00E-02	9.05E-02	7.04E-02	5.48E-02	3.20E-01	2.26E-01	1.60E-01	3.92E-02	1.75E-02	7.83E-03	1.81E-02	8.08E-03	3.61E-03	4.35E-02	3.08E-02	2.17E-02
Zinc	1.07E-01	4.79E-02	2.14E-02	4.86E-02	2.17E-02	9.72E-03	2.68E-02	1.89E-02	1.34E-02	**2.76E+00**	9.19E-01	3.06E-01	4.50E-01	1.50E-01	4.99E-02	1.15E-01	3.81E-02	1.27E-02	2.87E-01	9.56E-02	3.18E-02
Polychlorinated Biphenyls																					
Aroclor-1254	**1.83E+00**	8.26E-01	3.72E-01	**1.55E+01**	**7.00E+00**	**3.15E+00**	4.06E-01	1.81E-01	8.11E-02	**3.12E+00**	**1.40E+00**	6.24E-01	**4.62E+00**	**2.07E+00**	9.24E-01	**2.38E+00**	**1.07E+00**	4.76E-01	9.45E-02	4.23E-02	1.89E-02
Aroclor-1260	1.44E-01	6.49E-02	2.92E-02	**1.23E+00**	5.52E-01	2.49E-01	2.77E-02	1.24E-02	5.55E-03	2.46E-01	1.10E-01	4.92E-02	3.64E-01	1.63E-01	7.28E-02	1.88E-01	8.40E-02	3.76E-02	7.10E-03	3.18E-03	1.42E-03
Pesticides																					
4,4'-DDE	7.76E-03	3.47E-03	1.55E-03	1.41E-01	6.31E-02	2.82E-02	1.94E-03	8.68E-04	3.88E-04	5.64E-01	2.52E-01	1.13E-01	**1.42E+00**	4.50E-01	1.42E-01	7.72E-01	2.44E-01	7.72E-02	2.06E-02	9.21E-03	4.12E-03
4,4'-DDT	8.93E-03	3.99E-03	1.79E-03	1.16E-01	5.21E-02	2.33E-02	5.34E-03	2.39E-03	1.07E-03	1.83E-01	1.16E-01	7.31E-02	**1.19E+00**	3.77E-01	1.19E-01	6.37E-01	2.02E-01	6.37E-02	8.66E-03	5.48E-03	3.46E-03
Dieldrin	5.08E-01	2.27E-01	1.02E-01	4.06E-01	1.81E-01	8.11E-02	1.93E-01	8.64E-02	3.86E-02	**4.50E+00**	**2.01E+00**	8.99E-01	8.53E-01	3.82E-01	1.71E-01	2.42E-01	1.08E-01	4.84E-02	1.80E-01	8.05E-02	3.60E-02
Endrin	2.18E-02	9.74E-03	4.36E-03	5.28E-02	2.36E-02	1.06E-02	4.55E-02	2.03E-02	9.09E-03	2.09E-01	9.34E-02	4.18E-02	1.15E-01	5.15E-02	2.30E-02	5.31E-02	2.38E-02	1.06E-02	2.70E-02	1.21E-02	5.41E-03

Shaded cells indicate HQ > 1

Table B-26
Hazard Quotients for Aquatic Food Web Exposures (Mean) - Upstream Pond
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

	Raccoon			Mink			Muskrat			Marsh Wren			Belted Kingfisher			Great Blue Heron			Mallard		
Chemical	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**
Metals																					
Arsenic	2.94E-02	1.31E-02	5.88E-03	3.75E-02	1.68E-02	7.49E-03	2.71E-01	1.21E-01	5.41E-02	2.00E-01	1.15E-01	6.66E-02	3.29E-02	2.08E-02	1.32E-02	1.44E-02	9.09E-03	5.75E-03	8.04E-03	5.09E-03	3.22E-03
Cadmium	2.25E-02	1.01E-02	4.50E-03	1.40E-02	6.27E-03	2.80E-03	5.96E-02	1.89E-02	5.96E-03	1.25E-01	3.38E-02	9.09E-03	3.20E-02	8.61E-03	2.32E-03	1.19E-02	3.21E-03	8.63E-04	3.60E-02	9.69E-03	2.61E-03
Chromium	1.88E-02	8.42E-03	3.77E-03	8.66E-03	3.87E-03	1.73E-03	4.45E-02	1.99E-02	8.90E-03	7.66E-01	3.42E-01	1.53E-01	1.34E-01	5.98E-02	2.67E-02	4.67E-02	2.09E-02	9.33E-03	8.37E-02	3.74E-02	1.67E-02
Copper	3.02E-02	2.65E-02	2.33E-02	1.17E-02	1.03E-02	9.04E-03	5.37E-03	4.65E-03	4.03E-03	1.56E-01	1.36E-01	1.19E-01	2.23E-02	1.95E-02	1.70E-02	4.78E-03	4.17E-03	3.64E-03	9.05E-03	7.90E-03	6.89E-03
Lead	2.89E-02	9.14E-03	2.89E-03	2.65E-02	8.39E-03	2.65E-03	7.30E-02	2.31E-02	7.30E-03	6.52E-01	2.92E-01	1.30E-01	2.02E-01	9.02E-02	4.03E-02	9.06E-02	4.05E-02	1.81E-02	2.82E-01	8.92E-02	2.82E-02
Mercury	1.12E-02	8.70E-03	6.74E-03	6.53E-02	5.06E-02	3.92E-02	9.62E-02	4.30E-02	1.92E-02	8.80E-01	5.08E-01	2.93E-01	**1.20E+00**	6.95E-01	4.01E-01	6.18E-01	3.57E-01	2.06E-01	1.16E-01	6.72E-02	3.88E-02
Selenium	2.94E-02	2.29E-02	1.78E-02	6.85E-02	5.33E-02	4.15E-02	6.27E-02	4.88E-02	3.80E-02	2.21E-01	1.57E-01	1.11E-01	2.71E-02	1.21E-02	5.41E-03	1.25E-02	5.59E-03	2.50E-03	3.01E-02	2.13E-02	1.50E-02
Zinc	7.16E-02	3.20E-02	1.43E-02	3.25E-02	1.45E-02	6.51E-03	1.79E-02	1.27E-02	8.95E-03	**1.85E+00**	6.15E-01	2.05E-01	3.01E-01	1.00E-01	3.34E-02	7.66E-02	2.55E-02	8.48E-03	1.92E-01	6.40E-02	2.13E-02
Polychlorinated Biphenyls																					
Aroclor-1254	6.61E-01	2.98E-01	1.34E-01	**5.60E+00**	**2.52E+00**	**1.14E+00**	1.46E-01	6.54E-02	2.93E-02	**1.12E+00**	5.03E-01	2.25E-01	**1.66E+00**	7.45E-01	3.33E-01	8.59E-01	3.84E-01	1.72E-01	3.41E-02	1.52E-02	6.82E-03
Aroclor-1260	8.28E-02	3.73E-02	1.68E-02	7.04E-01	3.17E-01	1.43E-01	1.60E-02	7.16E-03	3.20E-03	1.41E-01	6.32E-02	2.83E-02	2.09E-01	9.35E-02	4.18E-02	1.08E-01	4.82E-02	2.16E-02	4.08E-03	1.83E-03	8.16E-04
Pesticides																					
4,4'-DDE	3.31E-03	1.48E-03	6.63E-04	6.02E-02	2.69E-02	1.20E-02	8.31E-04	3.72E-04	1.66E-04	2.41E-01	1.08E-01	4.82E-02	6.08E-01	1.92E-01	6.08E-02	3.29E-01	1.04E-01	3.29E-02	8.80E-03	3.94E-03	1.76E-03
4,4'-DDT	3.44E-03	1.54E-03	6.89E-04	4.49E-02	2.01E-02	8.97E-03	2.06E-03	9.23E-04	4.13E-04	7.05E-02	4.46E-02	2.82E-02	4.59E-01	1.45E-01	4.59E-02	2.46E-01	7.77E-02	2.46E-02	3.34E-03	2.11E-03	1.34E-03
Dieldrin	1.88E-01	8.42E-02	3.77E-02	1.50E-01	6.73E-02	3.01E-02	7.17E-02	3.21E-02	1.43E-02	**1.67E+00**	7.46E-01	3.33E-01	3.17E-01	1.42E-01	6.33E-02	8.98E-02	4.02E-02	1.80E-02	6.68E-02	2.99E-02	1.34E-02
Endrin	8.05E-03	3.60E-03	1.61E-03	1.95E-02	8.71E-03	3.89E-03	1.68E-02	7.51E-03	3.36E-03	7.71E-02	3.45E-02	1.54E-02	4.25E-02	1.90E-02	8.49E-03	1.96E-02	8.77E-03	3.92E-03	9.98E-03	4.46E-03	2.00E-03

Shaded cells indicate HQ > 1

Table B-27
Ecological Screening Statistics - AOC 3 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
2-Butanone	12.1 - 34.0	2 / 11	22.0	24.0	CAA03-SS09-1109	15.0	4.85	17.7	14.3	NSV	-- / --	NSV	--	-- / --	--	YES	NSV	NSV	NO[3]
Acetone	12.1 - 110	3 / 11	100	640	CAA03-SS09-1109	142	228	267	55.2	NSV	-- / --	NSV	--	-- / --	--	YES	NSV	NSV	NO[3]
Chloroform	6.00 - 12.1	3 / 11	0.60	0.90	CAA03-SS09-1109	2.97	1.67	3.88	2.35	1,844	0 / 11	0.0005	--	-- / --	--	NO	--	--	NO
Methylene chloride	12.1 - 34.0	3 / 11	9.00	13.0	CAA03-SS06-1109	13.0	3.37	14.8	12.5	1,250	0 / 11	0.01	--	-- / --	--	NO	--	--	NO
Styrene	5.00 - 12.1	2 / 11	1.00	10.0	CAA03-SS10-1109	3.59	2.43	4.92	3.07	64,000	0 / 11	0.0002	--	-- / --	--	NO	--	--	NO
Toluene	4.00 - 12.1	1 / 11	3.00	3.00	CAA03-SS10-1109	3.09	1.05	3.67	2.97	40,000	0 / 11	0.0001	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
1,1-Biphenyl	340 - 420	1 / 10	3,800	3,800	CAA03-SS06-1109	547	1,143	1,210	250	13,600	0 / 10	0.28	--	-- / --	--	NO	--	--	NO
2,4-Dimethylphenol	520 - 3,900	1 / 11	420	420	CAA03-SS06-1109	447	501	720	349	1,000	0 / 11	0.42	--	-- / --	--	NO	--	--	NO
2-Methylnaphthalene	21.0 - 49,000	4 / 11	6.80	25.0	CAA03-SS02-1109	2,416	7,347	6,432	41.6	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
2-Methylphenol	620 - 3,900	1 / 11	440	440	CAA03-SS06-1109	495	484	759	406	1,000	0 / 11	0.44	--	-- / --	--	NO	--	--	NO
3- and 4-Methylphenol	590 - 730	1 / 10	1,200	1,200	CAA03-SS06-1109	410	279	571	366	1,000	1 / 10	1.20	--	-- / --	--	YES	0.57	0.41	NO
Acenaphthene	21.0 - 3,900	6 / 11	6.90	24,000	CAA03-SS06-1109	2,382	7,193	6,313	58.2	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Acenaphthylene	21.0 - 3,900	7 / 11	3.80	4,100	CAA03-SS06-1109	589	1,299	1,298	53.9	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Anthracene	21.0 - 21.0	9 / 11	2.70	140,000	CAA03-SS06-1109	12,956	42,139	35,984	101	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Benzaldehyde	370 - 440	1 / 10	200	200	CAA03-SS08-1109	202	12.5	209	202	NSV	-- / --	NSV	--	-- / --	--	YES	NSV	NSV	NO[3]
Benzo(a)anthracene	-- - --	11 / 11	14.0	180,000	CAA03-SS06-1109	17,556	53,937	47,031	402	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Benzo(a)pyrene	-- - --	11 / 11	11.0	130,000	CAA03-SS06-1109	12,754	38,939	34,034	308	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Benzo(b)fluoranthene	-- - --	11 / 11	20.0	200,000	CAA03-SS06-1109	19,283	59,970	52,055	470	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Benzo(g,h,i)perylene	2.60 - 21.0	7 / 10	23.0	66,000	CAA03-SS06-1109	7,040	20,743	19,064	106	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Benzo(k)fluoranthene	21.0 - 26.0	8 / 11	9.20	81,000	CAA03-SS06-1109	8,132	24,250	21,384	176	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
bis(2-Ethylhexyl)phthalate	100 - 240,000	1 / 11	780	780	CAA03-SS07-1109	11,199	36,090	30,921	201	30,000	0 / 11	0.03	--	-- / --	--	NO	--	--	NO
Butylbenzylphthalate	340 - 3,900	1 / 11	2,800	2,800	CAA03-SS07-1109	586	905	1,081	298	30,000	0 / 11	0.09	--	-- / --	--	NO	--	--	NO
Carbazole	3,900 - 3,900	10 / 11	3.20	120,000	CAA03-SS06-1109	11,143	36,108	30,875	73.9	NSV	-- / --	NSV	--	-- / --	--	YES	NSV	NSV	YES
Chrysene	-- - --	11 / 11	12.0	210,000	CAA03-SS06-1109	20,259	62,979	54,676	374	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Dibenz(a,h)anthracene	21.0 - 21.0	9 / 11	3.60	22,000	CAA03-SS06-1109	2,184	6,585	5,782	77.5	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Dibenzofuran	340 - 3,900	1 / 11	19,000	19,000	CAA03-SS06-1109	2,056	5,644	5,141	349	NSV	-- / --	NSV	--	-- / --	--	YES	NSV	NSV	NO[3]
Di-n-octylphthalate	670 - 3,900	1 / 11	770	770	CAA03-SS07-1109	548	481	811	457	30,000	0 / 11	0.03	--	-- / --	--	NO	--	--	NO
Fluoranthene	-- - --	11 / 11	31.0	500,000	CAA03-SS06-1109	47,566	150,110	129,597	841	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Fluorene	21.0 - 3,900	6 / 11	11.0	40,000	CAA03-SS06-1109	3,853	12,002	10,412	79.8	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Indeno(1,2,3-cd)pyrene	18.0 - 20.0	9 / 11	29.0	69,000	CAA03-SS06-1109	6,790	20,656	18,078	235	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Naphthalene	21.0 - 3,900	5 / 11	7.70	26,000	CAA03-SS06-1109	2,557	7,797	6,818	46.7	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
PAH (HMW)	-- - --	11 / 11	124	1,348,000	CAA03-SS06-1109	130,543	404,123	351,388	2,936	18,000	2 / 11	74.9	--	-- / --	--	YES	19.5	7.25	YES
PAH (LMW)	-- - --	11 / 11	121	1,253,100	CAA03-SS06-1109	118,490	376,427	324,199	2,016	29,000	2 / 11	43.2	--	-- / --	--	YES	11.2	4.09	YES
Phenanthrene	-- - --	11 / 11	17.0	470,000	CAA03-SS06-1109	43,758	141,378	121,017	493	LPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Phenol	490 - 3,900	1 / 11	600	600	CAA03-SS06-1109	449	508	726	342	1,880	0 / 11	0.32	--	-- / --	--	NO	--	--	NO
Pyrene	-- - --	11 / 11	26.0	390,000	CAA03-SS06-1109	37,183	117,060	101,153	680	HPAH	-- / --	--	--	-- / --	--	YES	--	--	YES
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDD	3.50 - 4.20	8 / 11	2.30	280	CAA03-SS06-1109	31.3	82.8	76.5	6.31	583	0 / 11	0.48	--	-- / --	--	NO	--	--	NO
4,4'-DDE	0.96 - 3.90	7 / 11	0.80	83.0	CAA03-SS02-1109	14.1	27.3	29.1	3.29	114	0 / 11	0.73	--	-- / --	--	NO	--	--	NO
4,4'-DDT	1.00 - 3.60	9 / 11	1.60	88.0	CAA03-SS06-1109	19.7	31.8	37.1	6.19	100	0 / 11	0.88	--	-- / --	--	NO	--	--	NO
alpha-Chlordane	1.60 - 40.0	1 / 11	0.99	0.99	CAA03-SS02-1109	2.67	5.75	5.81	1.24	11.0	0 / 11	0.09	--	-- / --	--	NO	--	--	NO
Aroclor-1260	17.0 - 23.0	1 / 11	91.0	91.0	CAS004-4HA06-00-1199	17.4	24.4	30.7	12.2	8,000	0 / 11	0.01	--	-- / --	--	NO	--	--	NO
delta-BHC	1.60 - 2.10	1 / 11	140	140	CAA03-SS06-1109	13.6	41.9	36.5	1.48	226	0 / 11	0.62	--	-- / --	--	NO	--	--	NO
Dieldrin	3.20 - 4.20	2 / 11	1.40	650	CAA03-SS06-1109	60.7	195	168	3.04	10.5	1 / 11	61.9	--	-- / --	--	YES	16.0	5.78	YES
Endosulfan I	1.60 - 2.00	2 / 11	0.91	2,200	CAA03-SS06-1109	201	663	563	1.87	6.32	1 / 11	348	--	-- / --	--	YES	89.1	31.8	YES
Endosulfan sulfate	3.20 - 78.0	2 / 11	1.90	8.90	CAA03-SS02-1109	5.88	11.2	12.0	2.83	6.32	1 / 11	1.41	--	-- / --	--	YES	1.90	0.93	NO

Table B-27
Ecological Screening Statistics - AOC 3 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Endrin	3.20 - 3.90	6 / 11	3.90	130	CAA03-SS06-1109	21.8	39.2	43.2	6.75	1.95	6 / 11	66.7	--	-- / --	--	**YES**	22.2	11.2	**YES**
Endrin aldehyde	3.20 - 78.0	4 / 11	2.20	5.40	CAA03-SS08-1109	5.80	11.1	11.9	2.96	1.95	4 / 11	2.77	--	-- / --	--	**YES**	6.08	2.97	**YES**
gamma-BHC (Lindane)	1.70 - 2.10	4 / 11	0.82	860	CAA03-SS06-1109	80.2	259	222	2.50	7.75	2 / 11	111	--	-- / --	--	**YES**	28.6	10.3	**YES**
Inorganics (MG/KG)																			
Aluminum	-- - --	11 / 11	3,960	12,600	CAA03-SS01-1109	8,721	2,999	10,360	8,163	pH < 5.5	2 / 11	--	12,200	2 / 11	1.03	**YES**	mean pH > 5.5		NO
Antimony	0.44 - 0.44	10 / 11	0.070	0.25	CAA03-SS03-1109	0.15	0.067	0.18	0.13	78.0	0 / 11	0.003	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	11 / 11	1.00	7.30	CAA03-SS01-1109	3.13	1.61	4.01	2.80	18.0	0 / 11	0.41	--	-- / --	--	NO	--	--	NO
Barium	-- - --	11 / 11	11.3	101	CAS004-4HA06-00-1199	44.0	23.8	57.0	38.0	330	0 / 11	0.31	--	-- / --	--	NO	--	--	NO
Beryllium	0.32 - 0.32	10 / 11	0.19	0.72	CAA03-SS06-1109	0.46	0.21	0.57	0.41	40.0	0 / 11	0.02	--	-- / --	--	NO	--	--	NO
Cadmium	0.020 - 1.20	6 / 11	0.040	0.70	CAA03-SS07-1109	0.27	0.25	0.41	0.14	32.0	0 / 11	0.02	--	-- / --	--	NO	--	--	NO
Calcium [2]	-- - --	11 / 11	318	18,800	CAA03-SS06-1109	5,714	6,428	9,226	2,955	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	11 / 11	5.80	56.6	CAS004-4HA06-00-1199	19.0	13.8	26.6	15.8	64.0	0 / 11	0.88	--	-- / --	--	NO	--	--	NO
Cobalt	-- - --	11 / 11	0.72	8.80	CAS004-4HA06-00-1199	3.23	2.25	4.46	2.60	13.0	0 / 11	0.68	--	-- / --	--	NO	--	--	NO
Copper	-- - --	11 / 11	1.90	77.8	CAS004-4HA06-00-1199	14.9	22.7	27.3	7.38	70.0	1 / 11	1.11	4.25	8 / 11	18.3	**YES**	0.39	0.21	NO
Cyanide	0.70 - 0.84	1 / 11	0.070	0.070	CAS004-4HA06-00-1199	0.36	0.10	0.41	0.33	15.8	0 / 11	0.004	--	-- / --	--	NO	--	--	NO
Iron	-- - --	11 / 11	3,450	61,700	CAS004-4HA06-00-1199	15,560	16,018	24,314	11,603	5 < pH > 8	4 / 11	--	19,900	1 / 11	3.10	**YES**	mean pH in range		NO
Lead	-- - --	11 / 11	9.20	793	CAA03-SS06-1109	97.1	232	224	27.6	120	1 / 11	6.61	17.4	6 / 11	45.6	**YES**	1.87	0.81	NO
Magnesium [2]	-- - --	11 / 11	340	4,060	CAA03-SS07-1109	1,496	1,162	2,131	1,144	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Manganese	-- - --	11 / 11	19.1	315	CAA03-SS07-1109	138	106	197	98.6	220	3 / 11	1.43	324	0 / 11	0.97	NO	--	--	NO
Mercury	0.035 - 0.035	10 / 11	0.010	0.12	CAA03-SS02-1109	0.039	0.031	0.056	0.030	0.10	1 / 11	1.20	0.111	1 / 11	1.08	**YES**	0.56	0.39	NO
Nickel	-- - --	11 / 11	1.80	39.6	CAS004-4HA06-00-1199	8.66	10.6	14.5	5.85	38.0	1 / 11	1.04	9.95	2 / 11	3.98	**YES**	0.38	0.23	NO
Potassium [2]	-- - --	11 / 11	260	2,830	CAA03-SS07-1109	1,094	838	1,553	871	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	0.60 - 0.60	10 / 11	0.16	0.84	CAA03-SS06-1109	0.39	0.19	0.49	0.36	0.52	1 / 11	1.62	0.51	2 / 11	1.65	**YES**	0.95	0.75	NO
Silver	1.30 - 2.10	4 / 11	0.10	20.6	CAS004-4HA06-00-1199	2.42	6.03	5.72	0.71	560	0 / 11	0.04	--	-- / --	--	NO	--	--	NO
Sodium [2]	73.1 - 73.1	10 / 11	14.8	176	CAA03-SS06-1109	62.8	61.3	96.3	42.4	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Thallium	0.070 - 0.19	1 / 11	1.10	1.10	CAS004-4HA06-00-1199	0.16	0.31	0.33	0.080	1.00	1 / 11	1.10	--	-- / --	--	**YES**	0.33	0.16	NO
Vanadium	-- - --	11 / 11	8.60	35.7	CAS004-4HA06-00-1199	21.4	8.19	25.9	19.8	130	0 / 11	0.27	--	-- / --	--	NO	--	--	NO
Zinc	-- - --	11 / 11	9.70	154	CAA03-SS07-1109	56.0	48.3	82.4	37.9	120	2 / 11	1.28	26.5	6 / 11	5.81	**YES**	0.69	0.47	NO
Other Parameters																			
pH --	- --	10 / 10	4.60	8.80	CAA03-SS07-1109	7.04	1.43	7.87	6.90	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	10 / 10	6,200	51,000	CAA03-SS08-1109	23,260	13,859	31,294	19,427	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-28
Exceedances - AOC 3 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Soil Screening Value	95% UTL	CAA03-SS01	CAA03-SS02	CAA03-SS03	CAA03-SS04	CAA03-SS05	CAA03-SS06	CAA03-SS07	CAA03-SS08		CAA03-SS09	CAA03-SS10	CAS004-4HA06
Sample ID			CAA03-SS01-1109	CAA03-SS02-1109	CAA03-SS03-1109	CAA03-SS04-1109	CAA03-SS05-1109	CAA03-SS06-1109	CAA03-SS07-1109	CAA03-SS08-1109	CAA03-SS08P-1109	CAA03-SS09-1109	CAA03-SS10-1109	CAS004-4HA06-00-1199
Sample Date			11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09	11/12/99
Volatile Organic Compounds (UG/KG)														
2-Butanone	--	--	25 UJ	29 UJ	32 UJ	28 UJ	25 UJ	29 UJ	25 UJ	31 UJ	34 UJ	24 J	22 J	12.1 UL
Acetone	--	--	82 B	74 B	71 B	78 B	100 J	43 B	54 B	110 B	100 B	640 J	560 J	12.1 UL
Chloroform	1,844	--	6 UJ	7 UJ	8 UJ	7 UJ	0.6 J	7 UJ	6 UJ	7 UJ	8 UJ	0.9 J	0.6 J	12.1 UL
Methylene chloride	1,250	--	25 UJ	9 J	32 UJ	12 J	25 UJ	13 J	25 UJ	31 UJ	34 UJ	31 UJ	34 UJ	12.1 UL
Styrene	64,000	--	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	1 J	7 UJ	6 UJ	10 J	12.1 UL
Toluene	40,000	--	5 UJ	6 UJ	6 UJ	4 B	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	3 J	12.1 UL
Semivolatile Organic Compounds (UG/KG)														
1,1-Biphenyl	13,600	--	380 U	390 U	390 U	380 U	340 U	3,800	340 U	420 U	410 U	350 U	350 U	NA
2,4-Dimethylphenol	1,000	--	580 U	600 U	590 U	580 U	520 U	420 J	520 U	640 U	630 U	530 U	530 U	3,900 U
2-Methylnaphthalene	LMW PAH	--	23 J	25	6.8 J	23 U	21 U	49,000 U	20 J	26 U	25 U	21 U	21 U	3,900 U
2-Methylphenol	1,000	--	700 U	720 U	700 U	690 U	620 U	440 J	630 U	770 U	750 U	640 U	630 U	3,900 U
3- and 4-Methylphenol	1,000	--	660 U	680 U	670 U	660 U	590 U	1,200	590 U	730 U	720 U	610 U	600 U	NA
Acenaphthene	LMW PAH	--	61	65	27	6.9 J	21 U	24,000 J	50	26 U	25 U	21 U	21 U	3,900 U
Acenaphthylene	LMW PAH	--	30	240	72	26	3.8 J	4,100 J	19 J	26 U	25 U	21 U	21 U	3,900 U
Anthracene	LMW PAH	--	140	260	200	37	3.8 J	140,000	150	26 U	2.7 J	21 U	21 U	1,700 J
Benzaldehyde	--	--	420 UJ	430 U	420 U	420 U	370 U	440 U	380 U	460 U	200 J	380 U	380 U	NA
Benzo(a)anthracene	HMW PAH	--	590	1,600	740	200	26	180,000	1,100	20 J	28	14 J	18 J	8,800
Benzo(a)pyrene	HMW PAH	--	480	1,200	440	160	20 J	130,000	950	16 J	22 J	11 J	14 J	7,000
Benzo(b)fluoranthene	HMW PAH	--	840	2,100	670	190 J	28 J	200,000	1,400	29	40	20 J	26	6,800
Benzo(g,h,i)perylene	HMW PAH	--	130 L	440 L	70 L	23 L	21 UL	66,000 L	320 J	3.8 B	2.6 B	21 R	2.6 B	3,400 J
Benzo(k)fluoranthene	HMW PAH	--	190	650	140	71	9.2 J	81,000	560	26 U	25 U	21 U	21 U	6,800
bis(2-Ethylhexyl)phthalate	30,000	--	120 U	120 U	120 U	120 U	100 U	240,000 U	780 J	130 U	120 U	110 U	100 U	3,900 U
Butylbenzylphthalate	30,000	--	380 U	390 U	390 U	380 U	340 U	400 U	2,800	420 U	410 U	350 U	350 U	3,900 U
Carbazole	NSV	--	230 J	190	80	18 J	3.2 J	120,000 J	90 J	3 J	5.6 J	3.8 J	4 J	3,900 U
Chrysene	HMW PAH	--	730	1,300	580	170 J	17 J	210,000	1,400	18 J	26	12 J	16 J	8,600
Dibenz(a,h)anthracene	HMW PAH	--	110 J	200 K	83 K	37 K	21 U	22,000 K	160	4.3 J	4.6 J	21 U	3.6 J	1,400 J
Dibenzofuran	--	--	380 U	390 U	390 U	380 U	340 U	19,000	340 U	420 U	410 U	350 U	350 U	3,900 U
Di-n-octylphthalate	30,000	--	740 U	760 U	750 U	740 U	670 U	780 U	770	820 U	800 U	680 U	680 U	3,900 U
Fluoranthene	LMW PAH	--	1,700	3,000	1,600	350	44	500,000	2,400	40	57	31	40	14,000
Fluorene	LMW PAH	--	90	130	110	11 J	21 U	40,000 J	50	26 U	25 U	21 U	21 U	3,900 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	610 K	240 J	280 J	160 J	33 J	69,000 J	920 J	25 B	29	18 B	20 B	3,400 J
Naphthalene	LMW PAH	--	64	31	7.7 J	23 U	21 U	26,000 J	17 J	26 U	25 U	21 U	21 U	3,900 U
PAH (HMW)	18,000	--	5,080	10,130	4,003	1,281	197	1,348,000	9,610	151	217	124	135	57,200
PAH (LMW)	29,000	--	3,420	5,563	3,335	595	121	1,253,100	3,917	154	176	124	140	32,900
Phenanthrene	LMW PAH	--	1,300	1,800	1,300	130	17 J	470,000	1,200	23 J	41	19 J	26	5,500
Phenol	1,880	--	540 U	560 U	550 U	540 U	490 U	600	490 U	600 U	590 U	500 U	500 U	3,900 U
Pyrene	HMW PAH	--	1,400	2,400	1,000	270	26	390,000	2,800	36	54	26	36	11,000
Pesticide/Polychlorinated Biphenyls (UG/KG)														
4,4'-DDD	583	--	2.3 J	25 J	6 J	7.4 J	2.3 J	280 J	7.7 J	4 UJ	4.2 UJ	3.6 U	3.5 U	7.6 K
4,4'-DDE	114	--	0.96 B	83	3.5 J	7.3	1.2 J	52 J	3.2 U	4 UJ	0.8 J	3.6 U	1.7 J	3.9 U
4,4'-DDT	100	--	1 B	78	3.9 J	5.4 J	1.6 J	88 J	13 J	3.1 J	4.2 UJ	3.6 U	3.4 J	18 K
alpha-Chlordane	11.0	--	1.6 UJ	0.99 J	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U	2 U
Aroclor-1260	8,000	--	17 U	21 UL	20 U	21 U	20 UL	21 UJ	18 U	22 U	23 U	20 U	19 U	91 K
delta-BHC	226	--	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	140 J	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U	2 U
Dieldrin	10.5	--	3.2 UJ	3.9 U	3.7 U	1.4 J	3.8 UJ	650 J	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U	3.9 U
Endosulfan I	6.32	--	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	2,200 J	1.7 U	0.79 J	0.91 J	1.8 U	1.8 U	2 U
Endosulfan sulfate	6.32	--	1.9 J	8.9 J	3.7 U	3.9 U	3.8 UJ	78 U	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U	3.9 U
Endrin	1.95	--	3.2 UJ	3.9 U	16	10	3.8 UJ	130 J	3.2 U	6.8 J	16 J	55	3.9	3.9 U
Endrin aldehyde	1.95	--	3.2 UJ	3.9 U	3.8 J	2.6 J	3.8 UJ	78 U	3.2 U	3.5 J	5.4 J	3.6 U	2.2 J	3.9 U
gamma-BHC (Lindane)	7.75	--	5.2 J	9.6	0.82 J	2 U	1.9 UJ	860	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U	2 U
Explosives (UG/KG)														
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)														
Aluminum	pH < 5.5	12,200	12,600	8,930	10,800	9,870	8,080	10,600	8,070	11,800	12,600	4,100	3,960	6,320 L
Antimony	78.0	11.0	0.13 L	0.19 L	0.25 L	0.17 L	0.07 L	0.21 L	0.07 J	0.15	0.15	0.08 J	0.07 J	0.44 UJ
Arsenic	18.0	6.36	7.3	3	3.2	3.4	1.6	3.7	2.8	3.5	3.4	2.2	1.0	2.7 L
Barium	330	52.9	38.5	43.6 J	47.3 J	47.7 J	36 J	55.1 J	57	28.7	29.1	11.3	16.9	101 J
Beryllium	40.0	0.587	0.66	0.67	0.49	0.46 J	0.44 J	0.72	0.69	0.34 J	0.34 J	0.19 J	0.24 J	0.32 B
Cadmium	32.0	1.50	0.95 U	0.12 J	0.06 J	0.04 J	0.04 J	0.33 J	0.7 J	1.1 U	1.2 U	0.92 U	0.02 B	0.34 U
Chromium	64.0	18.2	24.9 K	15.2	13.1	16.7	9	17.8	22.8	18.4	18.8	8.4	5.8	56.6
Cobalt	13.0	9.93	2.9	3.4	2.7	2.5	2.5	4.4	4.9	1.8	1.9	0.72	0.84	8.8 J

Table B-28
Exceedances - AOC 3 Surface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAA03-SS01	CAA03-SS02	CAA03-SS03	CAA03-SS04	CAA03-SS05	CAA03-SS06	CAA03-SS07	CAA03-SS08		CAA03-SS09	CAA03-SS10	CAS004-4HA06
Sample ID			CAA03-SS01-1109	CAA03-SS02-1109	CAA03-SS03-1109	CAA03-SS04-1109	CAA03-SS05-1109	CAA03-SS06-1109	CAA03-SS07-1109	CAA03-SS08-1109	CAA03-SS08P-1109	CAA03-SS09-1109	CAA03-SS10-1109	CAS004-4HA06-00-1199
Sample Date			11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09	11/12/99
Copper	70.0	4.25	**5.3 K**	**9.4**	**4.9**	**5.0**	**3.8**	**31.8**	**17.7**	**4.8**	**4.2**	**1.9 J**	**1.9 J**	**77.8 J**
Cyanide	15.8	--	0.84 U	0.84 U	0.7 U	0.84 U	0.77 U	0.7 U	0.77 U	0.84 U	0.84 U	0.7 U	0.77 U	**0.07 L**
Iron	5 < pH > 8	19,900	**18,800**	**10,900 J**	**9,710 J**	**9,740 J**	**6,720 J**	**18,300 J**	**13,500**	**12,100**	**12,200**	**6,140**	**3,450**	**61,700 L**
Lead	120	17.4	**9.4 K**	**35.4**	**25.1**	**14.5**	**10.3**	**793**	**37**	**18.6**	**18.2**	**9.2**	**10.6**	**105 J**
Manganese	220	324	**85.1 K**	**155 J**	**121 J**	**106 J**	**98.9 J**	**253 J**	**315**	**39.9**	**35.8**	**19.1**	**27.9**	**302 J**
Mercury	0.10	0.111	**0.01 J**	**0.12**	**0.04**	**0.03 J**	**0.02 J**	**0.04 J**	0.035 U	**0.05**	**0.04**	**0.01 J**	**0.03 J**	**0.06 J**
Nickel	38.0	9.52	**5.5 J**	**9.8**	**5.3**	**5.2**	**3.7 J**	**9.0**	**8.8**	**4.5**	**4.7 J**	**1.8 J**	**1.9 J**	**39.6**
Selenium	0.52	0.51	**0.36 J**	**0.44 J**	**0.45 J**	**0.51**	**0.33 J**	**0.84**	**0.16 J**	**0.42 J**	**0.47 J**	**0.21 J**	**0.24 J**	0.6 U
Silver	560	2.10	1.4 U	1.6 U	1.4 U	1.5 U	1.5 U	2.1 U	1.3 U	**0.25 J**	**0.27 J**	**0.29 J**	**0.1 J**	**20.6 L**
Thallium	1.00	--	0.13 B	0.17 B	0.12 B	0.13 B	0.1 B	0.13 B	0.19 B	0.14 B	0.13 B	0.09 B	0.07 B	**1.1 L**
Vanadium	130	27.9	**27.2**	**19.5**	**20**	**17.8**	**14.6**	**26.9**	**24.3**	**29.1**	**29.5**	**11.4**	**8.6**	**35.7 J**
Zinc	120	26.5	**21.8 K**	**52.7**	**52.8**	**64.6**	**16.8**	**89.6**	**154**	**21.6**	**20.6**	**10**	**9.7**	**122 J**
Other Parameters														
pH	--	--	**8.5**	**7.7**	**7.6**	**7**	**6.4**	**8.3**	**8.8**	**6.5**	**5.9**	**4.6**	**5**	NA
Total organic carbon (TOC) (MG/KG)	--	--	**6,200**	**36,000**	**26,000**	**24,000**	**12,000**	**33,000**	**8,400**	**37,000**	**51,000**	**18,000**	**18,000**	NA

Notes:

Grey highlighting indicates value greater than screening value

Yellow highlighting indicates value equal to screening value

Bold indicates detections

NA - Not analyzed

Equals or Exceeds Background UTL

Table B-29
Ecological Screening Statistics - AOC 3 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
Acetone	12.8 - 100	1 / 11	240	240	CAA03-SB08-1109	47.9	64.7	83.3	31.2	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO**[3]
Chloroform	6.00 - 12.8	2 / 11	0.80	1.00	CAA03-SB05-1109A	3.06	1.45	3.85	2.69	1,844	0 / 11	0.001	--	-- / --	--	NO	--	--	NO
Methylene chloride	20.0 - 30.0	3 / 11	12.0	16.0	CAA03-SB03-1109A	13.0	1.71	14.0	12.9	1,250	0 / 11	0.01	--	-- / --	--	NO	--	--	NO
Styrene	5.00 - 12.8	1 / 11	2.00	2.00	CAA03-SB08-1109	2.94	1.18	3.59	2.80	64,000	0 / 11	0.00003	--	-- / --	--	NO	--	--	NO
Toluene	5.00 - 12.8	2 / 11	2.00	5.00	CAA03-SB08-1109	3.17	1.32	3.89	2.99	40,000	0 / 11	0.0001	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
2-Methylnaphthalene	18.0 - 3,800	4 / 11	3.60	120	CAA03-SB01-1109	194	567	503	21.1	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Acenaphthene	18.0 - 3,800	5 / 11	5.90	290	CAA03-SB01-1109	223	563	531	30.7	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Acenaphthylene	18.0 - 3,800	4 / 11	18.0	100	CAA03-SB02-1109A	196	566	505	27.1	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Anthracene	18.0 - 3,800	5 / 11	35.0	1,200	CAA03-SB01-1109	358	631	702	61.6	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)anthracene	18.0 - 22.0	9 / 11	8.00	1,900	CAA03-SB01-1109	475	705	860	93.1	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)pyrene	18.0 - 22.0	8 / 11	5.30	1,400	CAA03-SB07-1109	363	482	626	83.5	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(b)fluoranthene	18.0 - 22.0	8 / 11	8.90	2,300	CAA03-SB07-1109	533	767	952	110	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(g,h,i)perylene	3.00 - 22.0	6 / 9	48.0	560	CAA03-SB07-1109	165	204	292	54.2	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(k)fluoranthene	18.0 - 23.0	6 / 11	84.0	760	CAS004-4-HA06-02-119	229	304	395	65.2	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
bis(2-Ethylhexyl)phthalate	89.0 - 3,800	2 / 11	41.0	160	CAA03-SB07-1109	231	555	534	80.5	30,000	0 / 11	0.01	--	-- / --	--	NO	--	--	NO
Carbazole	18.0 - 3,800	5 / 11	17.0	650	CAA03-SB01-1109	277	571	590	49.4	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO**[3]
Chrysene	18.0 - 22.0	7 / 11	18.0	1,800	CAA03-SB01-1109	471	688	847	99.4	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Dibenz(a,h)anthracene	18.0 - 3,800	6 / 11	4.20	250	CAA03-SB07-1109	235	558	540	44.4	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Dibenzofuran	290 - 3,800	2 / 11	120	350	CAA03-SB01-1109	345	519	629	226	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO**[3]
Fluoranthene	7.40 - 22.0	7 / 11	4.50	5,400	CAA03-SB01-1109	1,150	1,903	2,190	110	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluorene	18.0 - 3,800	5 / 11	12.0	660	CAA03-SB01-1109	267	576	582	42.8	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Hexachlorobenzene	18.0 - 3,800	1 / 11	7.20	7.20	CAA03-SB08-1109	182	570	494	16.5	1,000	0 / 11	0.01	--	-- / --	--	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	18.0 - 3,800	6 / 11	14.0	1,400	CAA03-SB01-1109	483	696	864	94.5	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Naphthalene	18.0 - 3,800	4 / 11	7.40	240	CAA03-SB01-1109	206	566	515	26.3	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
PAH (HMW)	81.0 - 99.0	9 / 11	87.0	13,910	CAA03-SB07-1109	3,840	5,292	6,732	720	18,000	0 / 11	0.77	--	-- / --	--	NO	--	--	NO
PAH (LMW)	81.0 - 99.0	7 / 11	96.5	14,580	CAS004-4-HA06-02-119	3,627	5,576	6,674	515	29,000	0 / 11	0.50	--	-- / --	--	NO	--	--	NO
Phenanthrene	2.50 - 23.0	6 / 11	130	5,000	CAA03-SB01-1109	866	1,614	1,748	74.3	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pyrene	18.0 - 23.0	8 / 11	4.10	4,000	CAA03-SB01-1109	924	1,524	1,757	107	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDD	3.50 - 3.80	8 / 11	1.10	20.0	CAA03-SB07-1109	5.60	6.05	8.91	3.62	583	0 / 11	0.03	--	-- / --	--	NO	--	--	NO
4,4'-DDE	1.60 - 3.80	6 / 11	1.20	24.0	CAA03-SB02-1109A	7.80	8.80	12.6	4.02	114	0 / 11	0.21	--	-- / --	--	NO	--	--	NO
4,4'-DDT	3.50 - 3.60	6 / 11	1.80	32.0	CAA03-SB07-1109	8.17	10.3	13.8	4.28	100	0 / 11	0.32	--	-- / --	--	NO	--	--	NO
Aldrin	1.80 - 1.90	1 / 11	1.10	1.10	CAA03-SB08-1109	0.94	0.060	0.97	0.93	3.63	0 / 11	0.30	--	-- / --	--	NO	--	--	NO
alpha-Chlordane	1.80 - 2.00	1 / 11	0.89	0.89	CAA03-SB07-1109	0.92	0.035	0.94	0.92	11.0	0 / 11	0.08	--	-- / --	--	NO	--	--	NO
delta-BHC	1.80 - 2.00	1 / 11	1.40	1.40	CAA03-SB06-1109	0.97	0.15	1.05	0.96	226	0 / 11	0.01	--	-- / --	--	NO	--	--	NO
Dieldrin	3.50 - 3.80	6 / 11	0.65	3.20	CAA03-SB04-1109A	1.73	0.65	2.09	1.61	10.5	0 / 11	0.30	--	-- / --	--	NO	--	--	NO
Endosulfan sulfate	3.40 - 3.80	1 / 11	9.20	9.20	CAA03-SB07-1109	2.47	2.23	3.69	2.08	6.32	1 / 11	1.46	--	-- / --	--	**YES**	0.58	0.39	NO
Endrin	3.40 - 3.80	3 / 11	8.60	96.0	CAA03-SB08-1109	12.0	28.1	27.4	3.55	1.95	3 / 11	49.2	--	-- / --	--	**YES**	14.0	6.15	**YES**
Endrin ketone	3.40 - 3.80	1 / 11	0.88	0.88	CAA03-SB08-1109	1.70	0.28	1.85	1.67	1.95	0 / 11	0.45	--	-- / --	--	NO	--	--	NO
gamma-BHC (Lindane)	1.80 - 2.00	4 / 11	0.57	6.40	CAA03-SB01-1109	1.74	1.82	2.73	1.27	7.75	0 / 11	0.83	--	-- / --	--	NO	--	--	NO
gamma-Chlordane	1.80 - 2.00	2 / 11	1.00	23.0	CAA03-SB07-1109	2.94	6.65	6.58	1.25	11.0	1 / 11	2.09	--	-- / --	--	**YES**	0.60	0.27	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	11 / 11	3,550	24,500	CAA03-SB08-1109	12,223	6,582	15,820	10,568	pH < 5.5	3 / 11	--	13,000	3 / 11	1.88	**YES**	mean pH > 5.5		NO
Antimony	1.10 - 1.10	10 / 11	0.040	0.22	CAA03-SB09-1109	0.14	0.14	0.22	0.11	78.0	0 / 11	0.003	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	11 / 11	0.71	12.7	CAA03-SB09-1109	3.75	3.26	5.53	2.91	18.0	0 / 11	0.71	--	-- / --	--	NO	--	--	NO

Table B-29
Ecological Screening Statistics - AOC 3 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Barium	-- - --	11 / 11	17.0	54.8	CAA03-SB02-1109A	37.2	11.3	43.4	35.6	330	0 / 11	0.17	--	-- / --	--	NO	--	--	NO
Beryllium	0.35 - 0.35	10 / 11	0.31	0.95	CAA03-SB07-1109	0.55	0.22	0.67	0.51	40.0	0 / 11	0.02	--	-- / --	--	NO	--	--	NO
Cadmium	0.15 - 1.10	3 / 11	0.030	0.060	CAA03-SB07-1109	0.31	0.21	0.42	0.19	32.0	0 / 11	0.002	--	-- / --	--	NO	--	--	NO
Calcium [2]	-- - --	11 / 11	107	13,200	CAA03-SB06-1109	3,722	4,505	6,184	1,716	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	11 / 11	6.00	46.2	CAA03-SB09-1109	20.0	12.0	26.6	17.3	64.0	0 / 11	0.72	--	-- / --	--	NO	--	--	NO
Cobalt	-- - --	11 / 11	1.00	3.90	CAA03-SB09-1109	2.94	0.77	3.36	2.80	13.0	0 / 11	0.30	--	-- / --	--	NO	--	--	NO
Copper	-- - --	11 / 11	1.40	19.4	CAS004-4-HA06-02-119	5.39	5.06	8.15	4.19	70.0	0 / 11	0.28	--	-- / --	--	NO	--	--	NO
Iron	-- - --	11 / 11	3,390	31,800	CAA03-SB09-1109	14,662	9,063	19,615	12,262	5 < pH > 8	5 / 11	--	32,000	0 / 10	0.99	NO	--	--	NO
Lead	-- - --	11 / 11	3.80	29.7	CAS004-4-HA06-02-119	12.9	6.86	16.6	11.5	120	0 / 11	0.25	--	-- / --	--	NO	--	--	NO
Magnesium [2]	-- - --	11 / 11	355	2,780	CAA03-SB07-1109	1,306	810	1,748	1,103	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Manganese	-- - --	11 / 11	20.7	259	CAA03-SB07-1109	93.1	70.7	132	71.3	220	1 / 11	1.18	176	1 / 11	1.47	**YES**	0.60	0.42	NO
Mercury	0.036 - 0.036	10 / 11	0.010	0.060	CAA03-SB02-1109A	0.023	0.017	0.033	0.019	0.10	0 / 11	0.60	--	-- / --	--	NO	--	--	NO
Nickel	-- - --	11 / 11	2.10	20.4	CAS004-4-HA06-02-119	6.75	4.88	9.41	5.73	38.0	0 / 11	0.54	--	-- / --	--	NO	--	--	NO
Potassium [2]	920 - 920	10 / 11	235	3,660	CAA03-SB09-1109	1,060	948	1,578	822	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	0.66 - 0.66	10 / 11	0.23	0.51	CAA03-SB02-1109A	0.36	0.083	0.41	0.35	0.52	0 / 11	0.98	--	-- / --	--	NO	--	--	NO
Silver	0.98 - 1.60	3 / 11	0.44	8.50	CAS004-4-HA06-02-119	1.37	2.37	2.67	0.82	560	0 / 11	0.02	--	-- / --	--	NO	--	--	NO
Sodium [2]	31.0 - 31.0	10 / 11	12.8	101	CAA03-SB06-1109	45.2	25.7	59.2	38.6	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Vanadium	-- - --	11 / 11	6.50	57.0	CAA03-SB09-1109	25.7	15.4	34.1	22.0	130	0 / 11	0.44	--	-- / --	--	NO	--	--	NO
Zinc	-- - --	11 / 11	8.10	236	CAS004-4-HA06-02-119	40.0	65.5	75.8	23.7	120	1 / 11	1.97	28.0	3 / 11	8.43	**YES**	0.63	0.33	NO
Other Parameters																			
pH --	- --	10 / 10	4.60	8.40	CAA03-SB06-1109	6.99	1.48	7.85	6.83	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	10 / 10	3,600	18,000	CAA03-SB04-1109A	8,200	4,737	10,946	7,166	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-30
Exceedances - AOC 3 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAA03-SB01	CAA03-SB02	CAA03-SB03	CAA03-SB04	CAA03-SB05	CAA03-SB06	CAA03-SB07	CAA03-SB08		CAA03-SB09	CAA03-SB10	CAS004-4HA06
Sample ID			CAA03-SB01-1109	CAA03-SB02-1109A	CAA03-SB03-1109A	CAA03-SB04-1109A	CAA03-SB05-1109A	CAA03-SB06-1109	CAA03-SB07-1109	CAA03-SB08-1109	CAA03-SB08P-1109	CAA03-SB09-1109	CAA03-SB10-1109	CAS004-4-HA06-02-1199
Sample Date			11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09	11/12/99
Volatile Organic Compounds (UG/KG)														
Acetone	--	--	69 B	29 B	68 B	60 B	65 B	45 B	52 B	**220 J**	**240 J**	74 B	100 B	12.8 U
Chloroform	1,844	--	6 UJ	6 UJ	7 UJ	7 UJ	**1 J**	6 UJ	6 UJ	**0.8 J**	7 UJ	7 UJ	6 UJ	12.8 U
Methylene chloride	1,250	--	**13 J**	25 UJ	**16 J**	28 UJ	23 UJ	25 UJ	25 UJ	30 UJ	30 UJ	29 UJ	**12 J**	20 B
Styrene	64,000	--	5 UJ	5 UJ	6 UJ	6 UJ	5 UJ	5 UJ	5 UJ	**2 J**	6 UJ	6 UJ	5 UJ	12.8 UL
Toluene	40,000	--	5 UJ	5 UJ	6 UJ	6 UJ	5 UJ	**2 J**	5 UJ	6 UJ	**5 J**	6 UJ	5 UJ	12.8 UL
Semivolatile Organic Compounds (UG/KG)														
2-Methylnaphthalene	LMW PAH	--	**120 J**	**3.6 J**	22 U	22 U	22 U	**9.5 J**	**32 J**	23 U	22 U	22 U	18 U	3,800 U
Acenaphthene	LMW PAH	--	**290 J**	**8.5 J**	22 U	**5.9 J**	22 U	**38**	**160**	23 U	22 U	22 U	18 U	3,800 U
Acenaphthylene	LMW PAH	--	21 U	**100**	22 U	**23**	22 U	**18 J**	**50 J**	23 U	22 U	22 U	18 U	3,800 U
Anthracene	LMW PAH	--	**1,200**	**66**	22 U	**35**	22 U	**120**	**560**	23 U	22 U	22 U	18 U	3,800 U
Benzo(a)anthracene	HMW PAH	--	**1,900**	**350**	**11 J**	**180**	**8 J**	**440**	**1,800**	23 U	**11 J**	22 U	18 U	**500 J**
Benzo(a)pyrene	HMW PAH	--	**1,100**	**330**	**5.3 J**	**260**	22 U	**250**	**1,400**	23 U	**12 J**	22 U	18 U	**600 J**
Benzo(b)fluoranthene	HMW PAH	--	**1,700**	**470**	22 U	**360**	**8.9 J**	**480**	**2,300**	23 U	**19 J**	22 U	18 U	**490 J**
Benzo(g,h,i)perylene	HMW PAH	--	**220 L**	**130 L**	22 UL	**66 L**	22 UL	**48 L**	**560 J**	23 R	3 B	22 R	18 R	**440 J**
Benzo(k)fluoranthene	HMW PAH	--	**710**	**150**	22 U	**84**	22 U	**160**	**600**	23 U	22 U	22 U	18 U	**760 J**
bis(2-Ethylhexyl)phthalate	30,000	--	110 U	110 U	110 U	110 U	110 U	**41 J**	**160**	120 U	110 U	110 U	89 U	3,800 U
Carbazole	--	--	**650 J**	**39**	22 U	**17 J**	22 U	**180 J**	**210 J**	23 U	22 U	22 U	18 U	3,800 U
Chrysene	HMW PAH	--	**1,800**	**320**	22 U	**160 J**	22 U	**420**	**1,800**	23 U	**18 J**	22 U	18 U	**620 J**
Dibenz(a,h)anthracene	HMW PAH	--	**180 J**	**85 K**	22 U	**70 K**	22 U	**52 K**	**250**	23 U	**4.2 J**	22 U	18 U	3,800 U
Dibenzofuran	--	--	**350 J**	370 U	360 U	360 U	360 U	370 U	**120 J**	380 U	360 U	360 U	290 U	3,800 U
Fluoranthene	LMW PAH	--	**5,400**	**620**	8.4 B	**320**	7.4 B	**1,000**	**4,400**	**4.5 J**	22 U	22 U	18 U	**880 J**
Fluorene	LMW PAH	--	**660**	**33**	22 U	**12 J**	22 U	**58**	**220**	23 U	22 U	22 U	18 U	3,800 U
Hexachlorobenzene	1,000	--	21 U	22 U	22 U	22 U	22 U	22 U	22 U	23 U	**7.2 J**	22 U	18 U	3,800 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	**1,400 K**	**230 J**	**14 J**	**280 J**	22 U	**150 J**	**1,300 J**	5.6 B	21 B	22 U	18 U	3,800 U
Naphthalene	LMW PAH	--	**240**	**7.4 J**	22 U	22 U	22 U	**28**	**29**	23 U	22 U	22 U	18 U	3,800 U
PAH (HMW)	18,000	--	**13,010**	**2,545**	**89.7**	**1,720**	**87**	**2,810**	**13,910**	94.8 U	**98.2**	99 U	81 U	**7,880**
PAH (LMW)	29,000	--	**12,931**	**1,110**	82.5 U	**559**	82.4 U	**2,083**	**8,362**	**96.5**	99 U	99 U	81 U	**14,580**
Phenanthrene	LMW PAH	--	**5,000**	**260**	2.5 B	**130**	3.4 B	**800**	**2,900**	23 U	22 U	22 U	18 U	**400 J**
Pyrene	HMW PAH	--	**4,000**	**480**	**4.4 J**	**260**	**4.1 J**	**810**	**3,900**	23 U	22 U	22 U	18 U	**670 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)														
4,4'-DDD	583	--	**2.8 J**	**9.2**	**5.1 J**	**13**	**2.6 J**	**2.4 J**	**20 J**	3.8 UJ	**1.1 J**	3.6 UJ	3.5 U	3.8 U
4,4'-DDE	114	--	1.6 B	**24**	**7.4 J**	**20**	**6**	**1.2 J**	**19**	3.8 UJ	3.8 U	3.6 UJ	3.5 U	3.8 U
4,4'-DDT	100	--	3.6 UJ	**23**	3.5 UJ	**3.8**	**1.8 J**	3.5 UJ	**32**	**12 J**	3.8 U	3.6 UJ	3.5 U	**8.4 J**
Aldrin	3.63	--	1.9 UJ	1.8 U	1.8 UJ	1.8 U	1.8 U	1.8 UJ	1.9 U	**1.1 J**	2 U	1.9 UJ	1.8 U	1.9 U
alpha-Chlordane	11.0	--	1.9 UJ	1.8 U	1.8 UJ	1.8 U	1.8 U	1.8 UJ	**0.89 J**	2 UJ	2 U	1.9 UJ	1.8 U	1.9 U
delta-BHC	226	--	1.9 UJ	1.8 U	1.8 UJ	1.8 U	1.8 U	**1.4 J**	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U	1.9 U
Dieldrin	10.5	--	3.6 UJ	**1.9 J**	**2 J**	**3.2 J**	**1 J**	3.5 UJ	3.6 U	**1.3 J**	3.8 U	**0.65 J**	3.5 U	3.8 U
Endosulfan sulfate	6.32	--	3.6 UJ	3.6 U	3.5 UJ	3.6 U	3.4 U	3.5 UJ	**9.2 J**	3.8 UJ	3.8 U	3.6 UJ	3.5 U	3.8 U
Endrin	1.95	--	3.6 UJ	3.6 U	**13 J**	3.6 U	3.4 U	3.5 UJ	3.6 U	**96 J**	**5.5 J**	**8.6 J**	3.5 U	3.8 U
Endrin ketone	1.95	--	3.6 UJ	3.6 U	3.5 UJ	3.6 U	3.4 U	3.5 UJ	3.6 U	**0.88 J**	3.8 U	3.6 UJ	3.5 U	3.8 U
gamma-BHC (Lindane)	7.75	--	**6.4 J**	**1.5 J**	1.8 UJ	**0.57 J**	1.8 U	**4.1 J**	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U	1.9 U
gamma-Chlordane	11.0	--	1.9 UJ	1.8 U	1.8 UJ	**1 J**	1.8 U	1.8 UJ	**23 J**	2 UJ	2 U	1.9 UJ	1.8 U	1.9 U
Explosives (UG/KG)														
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)														
Aluminum	pH < 5.5	13,000	**8,290**	**15,800**	**12,100**	**10,600**	**10,300**	**11,600**	**10,800**	**23,100**	**24,500**	**22,600**	**4,310**	**3,550 L**
Antimony	78.0	--	**0.1 L**	**0.11 L**	**0.11 L**	**0.09 L**	**0.05 L**	**0.08 L**	**0.08**	**0.14**	**0.12**	**0.22**	**0.04 J**	1.1 B
Arsenic	18.0	5.54	**2.4**	**4**	**2.3**	**2.4**	**1.7**	**2.7**	**2.4**	**5.7**	**5.7**	**12.7**	**0.71**	**4.2 L**
Barium	330	84.5	**33**	**54.8 J**	**50.4 J**	**45.7 J**	**49.5 J**	**31.8 J**	**32.3**	**28.1**	**30.8**	**31.2**	**17**	**33.2 J**
Beryllium	40.0	0.52	**0.45 J**	**0.6**	**0.56**	**0.53**	**0.53**	**0.51**	**0.95**	**0.52 J**	**0.55**	**0.89**	**0.31 J**	0.35 B
Cadmium	32.0	--	1 U	0.86 U	1 U	0.85 U	0.89 U	**0.03 J**	**0.06 J**	1.1 U	0.98 U	**0.03 J**	0.65 U	0.15 U
Chromium	64.0	33.7	**12 K**	**18.1**	**14.6**	**13.7**	**11.5**	**16**	**17.6**	**33.6**	**35.6**	**46.2**	**6.0**	**29.2**
Cobalt	13.0	5.18	**2.7**	**3.4**	**2.8**	**3**	**2.7**	**2.6**	**3.5**	**3.0**	**3.1**	**3.9**	**1.0**	**3.6 J**
Copper	70.0	3.17	**4.9 K**	**3.6**	**3.6**	**2.9**	**3**	**3.3**	**9.4**	**3.4**	**3.8**	**4.0**	**1.4 J**	**19.4**
Iron	5 < pH > 8	32,000	**8,040**	**16,000 J**	**10,000 J**	**11,100 J**	**7,800 J**	**9,950 J**	**12,300**	**22,400**	**22,900**	**31,800**	**3,390**	**28,000 L**
Lead	120	8.79	**10 K**	**12.9**	**14.9**	**10.8**	**9**	**9.6**	**20**	**11.3**	**10.8**	**9.8**	**3.8**	**29.7**
Manganese	220	176	**64.1 K**	**161 J**	**86.4 J**	**92.8 J**	**122 J**	**46.8 J**	**259**	**27.3**	**26.8**	**30.5**	**20.7**	**114**
Mercury	0.10	0.14	0.036 U	**0.06**	**0.02 J**	**0.03 J**	**0.01 J**	**0.01 J**	**0.02 J**	**0.02 J**	**0.02 J**	**0.01 J**	**0.01 J**	**0.05 J**
Nickel	38.0	17.6	**4.1 J**	**5.3**	**5**	**4.5**	**4.4**	**5.3**	**7.4**	**6.5**	**6.8**	**8.9**	**2.1 J**	**20.4**
Selenium	0.52	0.64	**0.35 J**	**0.51**	**0.32 J**	**0.34 J**	**0.29 J**	**0.31 J**	**0.43**	**0.4 J**	**0.47 J**	**0.41 J**	**0.23 J**	0.66 U
Silver	560	1.10	1.6 U	1.3 U	1.6 U	1.3 U	1.3 U	1.4 U	1.2 U	**0.44 J**	**0.21 J**	**0.82 J**	0.98 U	**8.5 L**

Table B-30
Exceedances - AOC 3 Subsurface Soil
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAA03-SB01	CAA03-SB02	CAA03-SB03	CAA03-SB04	CAA03-SB05	CAA03-SB06	CAA03-SB07	CAA03-SB08		CAA03-SB09	CAA03-SB10	CAS004-4HA06
Sample ID			CAA03-SB01-1109	CAA03-SB02-1109A	CAA03-SB03-1109A	CAA03-SB04-1109A	CAA03-SB05-1109A	CAA03-SB06-1109	CAA03-SB07-1109	CAA03-SB08-1109	CAA03-SB08P-1109	CAA03-SB09-1109	CAA03-SB10-1109	CAS004-4-HA06-02-1199
Sample Date			11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09	11/12/99
Vanadium	130	48.3	**14.8**	**29.2**	**20.2**	**20.1**	**16.8**	**20.9**	**23.8**	**51.1**	**52.2**	**57**	**6.5**	**20.8**
Zinc	120	28.0	**16.4 K**	**20.2**	**21.1**	**18.1**	**15.1**	**15.5**	**39.6**	**20.9**	**21.3**	**28.1**	**8.1**	**236**
Other Parameters														
pH	--	--	**8.1**	**7.6**	**8.2**	**8.3**	**7.3**	**8.4**	**7.2**	**5.2**	**5.2**	**4.6**	**5.0**	NA
Total organic carbon (TOC) (MG/KG)	--	--	**3,900**	**8,400**	**5,400**	**18,000**	**5,300**	**3,600**	**14,000**	**11,000**	**9,200**	**5,700**	**6,700**	NA

Notes:

Grey highlighting indicates value greater than screening value

Yellow highlighting indicates value equal to screening value

Bold indicates detections

NA - Not analyzed

Equals or Exceeds Background UTL

Table B-31
Hazard Quotients for Terrestrial Food Web Exposures (Maximum) - AOC 3
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Meadow Vole			Short-tailed Shrew			White-footed Mouse			Red Fox			American Robin			Red-tailed Hawk		
	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL
Metals																		
Arsenic	**3.36E+00**	**1.50E+00**	6.72E-01	**2.60E+00**	**1.16E+00**	5.19E-01	**1.39E+00**	6.24E-01	2.79E-01	4.39E-02	1.96E-02	8.79E-03	2.96E-01	1.71E-01	9.86E-02	3.51E-03	2.03E-03	1.17E-03
Cadmium	2.86E-01	9.03E-02	2.86E-02	**3.35E+00**	**1.06E+00**	3.35E-01	7.56E-01	2.39E-01	7.56E-02	1.61E-01	7.21E-02	3.22E-02	**1.09E+00**	2.93E-01	7.88E-02	5.27E-02	1.42E-02	3.82E-03
Chromium	2.99E-01	1.34E-01	5.99E-02	**6.69E+00**	**2.99E+00**	**1.34E+00**	**1.39E+00**	6.21E-01	2.78E-01	3.31E-01	1.48E-01	6.61E-02	**9.61E+00**	**4.30E+00**	**1.92E+00**	7.73E-01	3.46E-01	1.55E-01
Copper	6.74E-02	5.83E-02	5.05E-02	2.01E-01	1.74E-01	1.51E-01	5.50E-02	4.76E-02	4.13E-02	3.03E-01	2.66E-01	2.34E-01	1.99E-01	1.74E-01	1.52E-01	6.75E-02	5.89E-02	5.14E-02
Lead	**5.14E+00**	**1.63E+00**	5.14E-01	**1.97E+01**	**6.24E+00**	**1.97E+00**	**5.01E+00**	**1.58E+00**	5.01E-01	**1.57E+00**	4.96E-01	1.57E-01	**2.27E+01**	**1.02E+01**	**4.54E+00**	**2.30E+00**	**1.03E+00**	4.60E-01
Mercury	**2.02E+00**	9.05E-01	4.05E-01	**9.22E+00**	**4.12E+00**	**1.84E+00**	**2.39E+00**	**1.07E+00**	4.78E-01	4.14E-02	3.20E-02	2.48E-02	3.30E-01	2.11E-01	1.35E-01	1.76E-03	1.13E-03	7.19E-04
Nickel	1.50E-01	1.06E-01	7.51E-02	5.74E-01	4.06E-01	2.87E-01	1.52E-01	1.08E-01	7.61E-02	6.35E-02	4.02E-02	2.54E-02	1.68E-01	1.43E-01	1.22E-01	1.45E-02	1.24E-02	1.05E-02
Selenium	**1.27E+00**	9.92E-01	7.72E-01	8.20E-01	6.39E-01	4.97E-01	4.81E-01	3.74E-01	2.91E-01	2.62E-01	2.04E-01	1.59E-01	4.86E-01	3.14E-01	2.04E-01	9.58E-02	6.20E-02	4.01E-02
Silver	8.60E-02	3.84E-02	1.72E-02	**4.11E+00**	**1.84E+00**	8.22E-01	8.55E-01	3.82E-01	1.71E-01	8.94E-02	4.00E-02	1.79E-02	**2.30E+00**	**1.03E+00**	4.60E-01	5.34E-02	2.39E-02	1.07E-02
Zinc	2.01E-01	1.42E-01	1.01E-01	**1.48E+00**	**1.04E+00**	7.38E-01	3.50E-01	2.48E-01	1.75E-01	9.82E-01	4.39E-01	1.96E-01	**8.12E+00**	**2.70E+00**	8.99E-01	**1.17E+00**	3.89E-01	1.29E-01
Polychlorinated Biphenyls																		
Aroclor-1260	3.32E-02	1.49E-02	6.65E-03	**1.26E+00**	5.62E-01	2.51E-01	2.66E-01	1.19E-01	5.32E-02	2.02E-01	9.12E-02	4.11E-02	1.81E-01	8.10E-02	3.62E-02	6.50E-02	2.91E-02	1.30E-02
Pesticides																		
4,4'-DDD	1.60E-02	7.17E-03	3.21E-03	4.64E-01	2.08E-01	9.28E-02	9.80E-02	4.38E-02	1.96E-02	6.23E-02	2.79E-02	1.25E-02	3.26E-01	1.03E-01	3.26E-02	7.32E-01	3.27E-01	1.46E-01
4,4'-DDE	3.85E-03	1.72E-03	7.70E-04	1.38E-01	6.15E-02	2.75E-02	2.89E-02	1.29E-02	5.77E-03	1.83E-02	8.19E-03	3.66E-03	9.58E-02	3.03E-02	9.58E-03	2.15E-01	9.61E-02	4.30E-02
4,4'-DDT	4.36E-03	1.95E-03	8.73E-04	1.46E-01	6.52E-02	2.92E-02	3.07E-02	1.37E-02	6.13E-03	1.95E-02	8.71E-03	3.89E-03	1.02E-01	3.22E-02	1.02E-02	2.29E-01	1.02E-01	4.57E-02
alpha-Chlordane	1.23E-05	8.73E-06	6.17E-06	1.10E-04	7.80E-05	5.51E-05	3.18E-05	2.25E-05	1.59E-05	2.01E-05	1.42E-05	1.00E-05	1.07E-04	4.77E-05	2.13E-05	3.84E-05	1.72E-05	7.67E-06
delta-BHC	1.17E-02	8.31E-03	5.87E-03	1.26E-02	8.91E-03	6.30E-03	5.29E-03	3.74E-03	2.64E-03	4.73E-03	3.34E-03	2.36E-03	3.37E-02	1.68E-02	8.38E-03	1.20E-02	5.96E-03	2.97E-03
Dieldrin	**1.18E+00**	5.27E-01	2.36E-01	**2.82E+01**	**1.26E+01**	**5.64E+00**	**6.02E+00**	**2.69E+00**	**1.20E+00**	**6.83E+00**	**3.05E+00**	**1.37E+00**	**6.51E+00**	**2.91E+00**	**1.30E+00**	**2.33E+00**	**1.04E+00**	4.67E-01
Endosulfan I	**2.51E+00**	**1.12E+00**	5.02E-01	**2.15E+00**	9.59E-01	4.29E-01	**1.03E+00**	4.60E-01	2.06E-01	1.38E-01	6.19E-02	2.77E-02	3.46E-02	1.55E-02	6.92E-03	1.22E-02	5.47E-03	2.45E-03
Endrin	4.46E-02	2.00E-02	8.93E-03	3.12E-01	1.40E-01	6.25E-02	7.32E-02	3.28E-02	1.46E-02	6.03E-02	2.70E-02	1.21E-02	**1.42E+00**	6.37E-01	2.85E-01	5.11E-01	2.29E-01	1.02E-01
gamma-BHC (Lindane)	2.59E-02	1.16E-02	5.17E-03	3.37E-01	1.51E-01	6.74E-02	7.51E-02	3.36E-02	1.50E-02	5.98E-02	2.67E-02	1.20E-02	3.13E-01	1.40E-01	6.27E-02	1.12E-01	5.02E-02	2.24E-02
Semivolatile Organics																		
Acenaphthene	1.07E-02	7.58E-03	5.36E-03	4.37E-03	3.09E-03	2.19E-03	3.39E-03	2.40E-03	1.69E-03	4.63E-04	3.27E-04	2.32E-04	3.85E-01	1.72E-01	7.69E-02	6.90E-07	3.09E-07	1.38E-07
Acenaphthylene	1.55E-03	1.10E-03	7.76E-04	6.19E-04	4.38E-04	3.09E-04	4.82E-04	3.41E-04	2.41E-04	6.88E-05	4.86E-05	3.44E-05	5.50E-02	2.46E-02	1.10E-02	2.00E-06	8.95E-07	4.00E-07
Anthracene	1.23E-02	5.52E-03	2.47E-03	8.61E-03	3.85E-03	1.72E-03	4.43E-03	1.98E-03	8.86E-04	6.34E-04	2.84E-04	1.27E-04	**1.44E+00**	6.46E-01	2.89E-01	2.00E-06	8.95E-07	4.00E-07
Benzo(a)anthracene	**2.89E+00**	**1.29E+00**	5.78E-01	**4.67E+00**	**2.09E+00**	9.34E-01	**1.39E+00**	6.20E-01	2.77E-01	2.35E-01	1.05E-01	4.71E-02	9.29E-01	4.15E-01	1.86E-01	3.40E-06	1.52E-06	6.80E-07
Benzo(a)pyrene	**1.49E+00**	6.68E-01	2.99E-01	**3.86E+00**	**1.73E+00**	7.72E-01	9.52E-01	4.26E-01	1.90E-01	1.56E-01	6.98E-02	3.12E-02	6.32E-01	2.83E-01	1.26E-01	2.40E-06	1.07E-06	4.80E-07
Benzo(b)fluoranthene	**3.35E+00**	**1.50E+00**	6.71E-01	**4.50E+00**	**2.01E+00**	8.99E-01	**1.44E+00**	6.43E-01	2.87E-01	2.59E-01	1.16E-01	5.18E-02	9.74E-01	4.35E-01	1.95E-01	5.80E-06	2.59E-06	1.16E-06
Benzo(g,h,i)perylene	4.69E-01	2.10E-01	9.38E-02	**1.21E+00**	5.41E-01	2.42E-01	2.56E-01	1.14E-01	5.12E-02	6.19E-02	2.77E-02	1.24E-02	1.84E-01	8.25E-02	3.69E-02	1.60E-06	7.16E-07	3.20E-07
Benzo(k)fluoranthene	8.56E-01	3.83E-01	1.71E-01	**1.79E+00**	7.99E-01	3.58E-01	4.47E-01	2.00E-01	8.94E-02	8.83E-02	3.95E-02	1.77E-02	3.08E-01	1.38E-01	6.16E-02	1.50E-06	6.71E-07	3.00E-07
Chrysene	**3.41E+00**	**1.52E+00**	6.81E-01	**7.53E+00**	**3.37E+00**	**1.51E+00**	**2.05E+00**	9.18E-01	4.11E-01	2.98E-01	1.33E-01	5.96E-02	**1.34E+00**	5.98E-01	2.67E-01	8.00E-07	3.58E-07	1.60E-07
Dibenz(a,h)anthracene	1.80E-01	8.04E-02	3.59E-02	8.41E-01	3.76E-01	1.68E-01	1.81E-01	8.09E-02	3.62E-02	2.60E-02	1.16E-02	5.21E-03	1.17E-01	5.25E-02	2.35E-02	2.00E-06	8.95E-07	4.00E-07
Fluoranthene	5.26E-02	2.35E-02	1.05E-02	6.49E-02	2.90E-02	1.30E-02	2.33E-02	1.04E-02	4.66E-03	3.42E-03	1.53E-03	6.83E-04	**3.81E+00**	**1.70E+00**	7.61E-01	3.20E-06	1.43E-06	6.40E-07
Fluorene	9.58E-03	4.28E-03	1.92E-03	3.97E-03	1.78E-03	7.94E-04	2.98E-03	1.33E-03	5.96E-04	4.34E-04	1.94E-04	8.68E-05	4.88E-01	2.18E-01	9.76E-02	2.00E-06	8.95E-07	4.00E-07
Indeno(1,2,3-cd)pyrene	4.90E-01	2.19E-01	9.79E-02	**2.31E+00**	**1.03E+00**	4.62E-01	4.81E-01	2.15E-01	9.63E-02	7.58E-02	3.39E-02	1.52E-02	3.17E-01	1.42E-01	6.34E-02	2.40E-06	1.07E-06	4.80E-07
Phenanthrene	8.28E-02	3.70E-02	1.66E-02	5.34E-02	2.39E-02	1.07E-02	2.88E-02	1.29E-02	5.76E-03	4.21E-03	1.88E-03	8.42E-04	**4.72E+00**	**2.11E+00**	9.43E-01	8.80E-07	3.94E-07	1.76E-07
Pyrene	**1.45E+01**	**6.49E+00**	**2.90E+00**	**1.34E+01**	**5.99E+00**	**2.68E+00**	**5.77E+00**	**2.58E+00**	**1.15E+00**	8.11E-01	3.63E-01	1.62E-01	**3.75E+00**	**1.68E+00**	7.50E-01	2.90E-06	1.30E-06	5.80E-07

Shaded cells indicate HQ > 1

Table B-32
Hazard Quotients for Terrestrial Food Web Exposures (95% UCL) - AOC 3
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Meadow Vole			Short-tailed Shrew			White-footed Mouse			Red Fox			American Robin			Red-tailed Hawk		
	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL	NOAEL	MATC	LOAEL
Metals																		
Arsenic	6.23E-02	2.79E-02	1.25E-02	4.97E-01	2.22E-01	9.94E-02	7.85E-02	3.51E-02	1.57E-02	5.24E-03	2.35E-03	1.05E-03	2.15E-02	1.24E-02	7.16E-03	5.54E-04	3.20E-04	1.85E-04
Cadmium	1.48E-02	4.69E-03	1.48E-03	2.34E-01	7.41E-02	2.34E-02	3.87E-02	1.22E-02	3.87E-03	1.68E-02	7.50E-03	3.35E-03	7.44E-02	2.00E-02	5.39E-03	7.52E-03	2.03E-03	5.46E-04
Chromium	2.76E-02	1.23E-02	5.52E-03	2.83E-01	1.27E-01	5.67E-02	3.73E-02	1.67E-02	7.46E-03	2.72E-02	1.22E-02	5.44E-03	3.92E-01	1.75E-01	7.84E-02	6.90E-02	3.09E-02	1.38E-02
Lead	9.23E-02	2.92E-02	9.23E-03	9.53E-01	3.01E-01	9.53E-02	1.24E-01	3.92E-02	1.24E-02	9.36E-02	2.96E-02	9.36E-03	8.31E-01	3.72E-01	1.66E-01	1.51E-01	6.76E-02	3.02E-02
Mercury	5.79E-02	2.59E-02	1.16E-02	1.77E-01	7.90E-02	3.53E-02	3.91E-02	1.75E-02	7.83E-03	1.89E-03	1.46E-03	1.13E-03	7.38E-03	4.71E-03	3.01E-03	2.41E-04	1.54E-04	9.86E-05
Selenium	7.31E-02	5.69E-02	4.43E-02	2.14E-01	1.66E-01	1.29E-01	4.92E-02	3.83E-02	2.98E-02	2.57E-02	2.00E-02	1.56E-02	6.23E-02	4.03E-02	2.61E-02	9.93E-03	6.43E-03	4.16E-03
Silver	2.42E-03	1.08E-03	4.85E-04	1.01E-01	4.53E-02	2.03E-02	1.50E-02	6.70E-03	3.00E-03	2.73E-03	1.22E-03	5.46E-04	5.51E-02	2.46E-02	1.10E-02	1.68E-03	7.53E-04	3.37E-04
Zinc	1.05E-02	7.41E-03	5.24E-03	9.98E-02	7.06E-02	4.99E-02	1.70E-02	1.20E-02	8.48E-03	7.30E-02	3.27E-02	1.46E-02	5.32E-01	1.77E-01	5.89E-02	1.01E-01	3.36E-02	1.12E-02
Polychlorinated Biphenyls																		
Aroclor-1260	2.85E-03	1.27E-03	5.70E-04	7.40E-02	3.31E-02	1.48E-02	1.21E-02	5.41E-03	2.42E-03	1.28E-02	5.78E-03	2.60E-03	1.07E-02	4.77E-03	2.13E-03	4.82E-03	2.16E-03	9.65E-04
Pesticides																		
Dieldrin	1.44E-01	6.42E-02	2.87E-02	**4.54E+00**	**2.03E+00**	9.08E-01	7.17E-01	3.21E-01	1.43E-01	**1.15E+00**	5.13E-01	2.29E-01	**1.03E+00**	4.62E-01	2.07E-01	4.66E-01	2.08E-01	9.32E-02
Endosulfan I	3.04E-01	1.36E-01	6.07E-02	3.43E-01	1.53E-01	6.86E-02	1.22E-01	5.44E-02	2.43E-02	2.31E-02	1.03E-02	4.61E-03	5.46E-03	2.44E-03	1.09E-03	2.43E-03	1.09E-03	4.85E-04
Endrin	7.02E-03	3.14E-03	1.40E-03	6.49E-02	2.90E-02	1.30E-02	1.13E-02	5.04E-03	2.25E-03	1.31E-02	5.84E-03	2.61E-03	2.92E-01	1.31E-01	5.84E-02	1.32E-01	5.89E-02	2.63E-02
Semivolatile Organics																		
Anthracene	1.50E-03	6.71E-04	3.00E-04	1.38E-03	6.18E-04	2.76E-04	5.26E-04	2.35E-04	1.05E-04	1.06E-04	4.74E-05	2.12E-05	2.29E-01	1.02E-01	4.58E-02	7.68E-07	3.43E-07	1.54E-07
Benzo(a)anthracene	3.57E-01	1.59E-01	7.13E-02	7.62E-01	3.41E-01	1.52E-01	1.68E-01	7.49E-02	3.35E-02	4.00E-02	1.79E-02	8.01E-03	1.50E-01	6.69E-02	2.99E-02	8.70E-07	3.89E-07	1.74E-07
Benzo(a)pyrene	1.85E-01	8.27E-02	3.70E-02	6.31E-01	2.82E-01	1.26E-01	1.15E-01	5.15E-02	2.30E-02	2.66E-02	1.19E-02	5.32E-03	1.02E-01	4.56E-02	2.04E-02	1.00E-06	4.47E-07	2.00E-07
Benzo(b)fluoranthene	4.12E-01	1.84E-01	8.25E-02	7.31E-01	3.27E-01	1.46E-01	1.73E-01	7.73E-02	3.46E-02	4.39E-02	1.96E-02	8.77E-03	1.56E-01	6.99E-02	3.13E-02	1.10E-06	4.91E-07	2.20E-07
Benzo(g,h,i)perylene	6.40E-02	2.86E-02	1.28E-02	2.18E-01	9.77E-02	4.37E-02	3.42E-02	1.53E-02	6.84E-03	1.16E-02	5.21E-03	2.33E-03	3.29E-02	1.47E-02	6.57E-03	8.73E-07	3.90E-07	1.75E-07
Benzo(k)fluoranthene	1.07E-01	4.77E-02	2.13E-02	2.95E-01	1.32E-01	5.90E-02	5.46E-02	2.44E-02	1.09E-02	1.52E-02	6.78E-03	3.03E-03	5.02E-02	2.24E-02	1.00E-02	8.49E-07	3.80E-07	1.70E-07
Chrysene	4.19E-01	1.87E-01	8.38E-02	**1.22E+00**	5.47E-01	2.45E-01	2.47E-01	1.11E-01	4.94E-02	5.05E-02	2.26E-02	1.01E-02	2.15E-01	9.60E-02	4.29E-02	7.71E-07	3.45E-07	1.54E-07
Fluoranthene	6.45E-03	2.88E-03	1.29E-03	1.05E-02	4.70E-03	2.10E-03	2.79E-03	1.25E-03	5.58E-04	5.76E-04	2.58E-04	1.15E-04	6.08E-01	2.72E-01	1.22E-01	1.24E-06	5.53E-07	2.47E-07
Indeno(1,2,3-cd)pyrene	6.06E-02	2.71E-02	1.21E-02	3.78E-01	1.69E-01	7.56E-02	5.83E-02	2.61E-02	1.17E-02	1.29E-02	5.78E-03	2.59E-03	5.12E-02	2.29E-02	1.02E-02	1.01E-06	4.52E-07	2.02E-07
Phenanthrene	1.01E-02	4.51E-03	2.02E-03	8.59E-03	3.84E-03	1.72E-03	3.43E-03	1.53E-03	6.86E-04	7.05E-04	3.15E-04	1.41E-04	7.49E-01	3.35E-01	1.50E-01	7.56E-07	3.38E-07	1.51E-07
Pyrene	**1.78E+00**	7.95E-01	3.56E-01	**2.17E+00**	9.70E-01	4.34E-01	6.92E-01	3.10E-01	1.38E-01	1.37E-01	6.12E-02	2.74E-02	6.00E-01	2.68E-01	1.20E-01	1.38E-06	6.19E-07	2.77E-07

Shaded cells indicate HQ > 1

Table B-33 Hazard Quotients for Terrestrial Food Web Exposures (Mean) - AOC 3 Sites 4, 9, and AOC 3 Site Investigation Report *Cheatham Annex, Williamsburg, Virginia*																		
	Meadow Vole			**Short-tailed Shrew**			**White-footed Mouse**			**Red Fox**			**American Robin**			**Red-tailed Hawk**		
Chemical	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**	**NOAEL**	**MATC**	**LOAEL**
Metals																		
Arsenic	4.49E-02	2.01E-02	8.97E-03	3.84E-01	1.72E-01	7.68E-02	5.59E-02	2.50E-02	1.12E-02	3.77E-03	1.69E-03	7.54E-04	1.65E-02	9.53E-03	5.50E-03	3.29E-04	1.90E-04	1.10E-04
Cadmium	9.90E-03	3.13E-03	9.90E-04	1.56E-01	4.94E-02	1.56E-02	2.58E-02	8.15E-03	2.58E-03	1.12E-02	5.00E-03	2.24E-03	4.96E-02	1.34E-02	3.60E-03	5.02E-03	1.35E-03	3.64E-04
Chromium	1.98E-02	8.84E-03	3.95E-03	2.03E-01	9.07E-02	4.06E-02	2.67E-02	1.20E-02	5.34E-03	1.95E-02	8.72E-03	3.90E-03	2.81E-01	1.26E-01	5.61E-02	4.94E-02	2.21E-02	9.88E-03
Lead	4.00E-02	1.26E-02	4.00E-03	4.13E-01	1.31E-01	4.13E-02	5.37E-02	1.70E-02	5.37E-03	4.06E-02	1.28E-02	4.06E-03	3.60E-01	1.61E-01	7.20E-02	6.55E-02	2.93E-02	1.31E-02
Mercury	4.04E-02	1.81E-02	8.09E-03	1.23E-01	5.50E-02	2.46E-02	2.75E-02	1.23E-02	5.49E-03	1.33E-03	1.03E-03	7.97E-04	5.13E-03	3.28E-03	2.10E-03	1.71E-04	1.09E-04	6.99E-05
Selenium	5.81E-02	4.52E-02	3.52E-02	1.69E-01	1.32E-01	1.03E-01	3.92E-02	3.05E-02	2.37E-02	2.04E-02	1.59E-02	1.24E-02	4.95E-02	3.20E-02	2.07E-02	7.89E-03	5.11E-03	3.31E-03
Silver	1.03E-03	4.61E-04	2.06E-04	4.29E-02	1.92E-02	8.59E-03	6.36E-03	2.84E-03	1.27E-03	1.16E-03	5.18E-04	2.32E-04	2.33E-02	1.04E-02	4.67E-03	7.14E-04	3.19E-04	1.43E-04
Zinc	7.12E-03	5.04E-03	3.56E-03	6.78E-02	4.79E-02	3.39E-02	1.15E-02	8.15E-03	5.76E-03	4.96E-02	2.22E-02	9.92E-03	3.62E-01	1.20E-01	4.00E-02	6.86E-02	2.28E-02	7.59E-03
Polychlorinated Biphenyls																		
Aroclor-1260	1.81E-03	8.08E-04	3.61E-04	4.20E-02	1.88E-02	8.40E-03	7.12E-03	3.18E-03	1.42E-03	7.33E-03	3.30E-03	1.49E-03	6.07E-03	2.71E-03	1.21E-03	2.74E-03	1.23E-03	5.49E-04
Pesticides																		
Dieldrin	5.22E-02	2.33E-02	1.04E-02	**1.65E+00**	7.36E-01	3.29E-01	2.60E-01	1.16E-01	5.20E-02	4.15E-01	1.86E-01	8.31E-02	3.75E-01	1.68E-01	7.49E-02	1.69E-01	7.56E-02	3.38E-02
Endosulfan I	1.08E-01	4.85E-02	2.17E-02	1.22E-01	5.47E-02	2.45E-02	4.34E-02	1.94E-02	8.69E-03	8.23E-03	3.68E-03	1.65E-03	1.95E-03	8.71E-04	3.89E-04	8.66E-04	3.87E-04	1.73E-04
Endrin	3.57E-03	1.60E-03	7.14E-04	3.28E-02	1.47E-02	6.55E-03	5.73E-03	2.56E-03	1.15E-03	6.60E-03	2.95E-03	1.32E-03	1.48E-01	6.60E-02	2.95E-02	6.66E-02	2.98E-02	1.33E-02
Semivolatile Organics																		
Anthracene	5.40E-04	2.41E-04	1.08E-04	4.97E-04	2.22E-04	9.95E-05	1.90E-04	8.48E-05	3.79E-05	3.82E-05	1.71E-05	7.64E-06	8.24E-02	3.69E-02	1.65E-02	7.62E-07	3.41E-07	1.52E-07
Benzo(a)anthracene	1.33E-01	5.95E-02	2.66E-02	2.84E-01	1.27E-01	5.69E-02	6.25E-02	2.80E-02	1.25E-02	1.49E-02	6.68E-03	2.99E-03	5.59E-02	2.50E-02	1.12E-02	7.78E-07	3.48E-07	1.56E-07
Benzo(a)pyrene	6.93E-02	3.10E-02	1.39E-02	2.37E-01	1.06E-01	4.73E-02	4.32E-02	1.93E-02	8.63E-03	9.97E-03	4.46E-03	1.99E-03	3.83E-02	1.71E-02	7.65E-03	8.38E-07	3.75E-07	1.68E-07
Benzo(b)fluoranthene	1.53E-01	6.83E-02	3.06E-02	2.71E-01	1.21E-01	5.42E-02	6.40E-02	2.86E-02	1.28E-02	1.62E-02	7.27E-03	3.25E-03	5.79E-02	2.59E-02	1.16E-02	8.85E-07	3.96E-07	1.77E-07
Benzo(g,h,i)perylene	2.36E-02	1.06E-02	4.73E-03	8.07E-02	3.61E-02	1.61E-02	1.26E-02	5.65E-03	2.53E-03	4.30E-03	1.92E-03	8.61E-04	1.21E-02	5.43E-03	2.43E-03	8.02E-07	3.59E-07	1.60E-07
Benzo(k)fluoranthene	4.06E-02	1.82E-02	8.12E-03	1.12E-01	5.01E-02	2.24E-02	2.08E-02	9.29E-03	4.15E-03	5.77E-03	2.58E-03	1.15E-03	1.91E-02	8.53E-03	3.81E-03	7.80E-07	3.49E-07	1.56E-07
Chrysene	1.55E-01	6.94E-02	3.11E-02	4.54E-01	2.03E-01	9.07E-02	9.16E-02	4.10E-02	1.83E-02	1.87E-02	8.37E-03	3.74E-03	7.95E-02	3.56E-02	1.59E-02	7.53E-07	3.37E-07	1.51E-07
Fluoranthene	2.37E-03	1.06E-03	4.73E-04	3.86E-03	1.72E-03	7.71E-04	1.02E-03	4.58E-04	2.05E-04	2.12E-04	9.46E-05	4.23E-05	2.23E-01	9.99E-02	4.47E-02	9.83E-07	4.40E-07	1.97E-07
Indeno(1,2,3-cd)pyrene	2.28E-02	1.02E-02	4.56E-03	1.42E-01	6.35E-02	2.84E-02	2.19E-02	9.80E-03	4.38E-03	4.86E-03	2.17E-03	9.72E-04	1.92E-02	8.60E-03	3.85E-03	8.51E-07	3.81E-07	1.70E-07
Phenanthrene	3.64E-03	1.63E-03	7.29E-04	3.11E-03	1.39E-03	6.21E-04	1.24E-03	5.55E-04	2.48E-04	2.55E-04	1.14E-04	5.10E-05	2.71E-01	1.21E-01	5.41E-02	7.12E-07	3.19E-07	1.42E-07
Pyrene	6.54E-01	2.92E-01	1.31E-01	7.98E-01	3.57E-01	1.60E-01	2.55E-01	1.14E-01	5.09E-02	5.03E-02	2.25E-02	1.01E-02	2.21E-01	9.86E-02	4.41E-02	1.07E-06	4.78E-07	2.14E-07
Shaded cells indicate HQ > 1																		

Table B-34
Ecological Screening Statistics - Site 9 Surface Soil - Site
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
Acetone	52.0 - 82.0	1 / 5	140	140	CAS09-SS05-1109	54.8	47.9	100	44.1	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO[3]**
Methylene chloride	24.0 - 27.0	3 / 5	9.00	50.0	CAS09-SS05-1109	20.9	16.8	36.9	17.1	1,250	0 / 5	0.04	--	-- / --	--	NO	--	--	NO
Toluene	4.00 - 5.00	1 / 5	2.00	2.00	CAS09-SS01-1009	2.30	0.27	2.56	2.29	40,000	0 / 5	0.0001	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
Acenaphthene	20.0 - 22.0	1 / 5	1.70	1.70	CAS09-SS02-1109	8.84	4.01	12.7	7.36	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Acenaphthylene	20.0 - 22.0	1 / 5	1.20	1.20	CAS09-SS02-1109	8.74	4.24	12.8	6.86	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Anthracene	20.0 - 22.0	2 / 5	2.10	6.50	CAS09-SS02-1109	8.02	3.75	11.6	6.91	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)anthracene	20.0 - 20.0	4 / 5	3.40	40.0	CAS09-SS02-1109	14.0	15.0	28.3	9.36	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)pyrene	20.0 - 21.0	3 / 5	3.90	39.0	CAS09-SS02-1109	14.3	14.1	27.7	10.5	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(b)fluoranthene	20.0 - 20.0	4 / 5	5.50	61.0	CAS09-SS02-1109	20.3	23.3	42.5	13.3	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(g,h,i)perylene	20.0 - 21.0	3 / 5	2.50	15.0	CAS09-SS02-1109	8.24	5.30	13.3	6.61	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(k)fluoranthene	20.0 - 22.0	2 / 5	6.90	24.0	CAS09-SS02-1109	12.5	6.64	18.8	11.4	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Carbazole	20.0 - 22.0	1 / 5	2.70	2.70	CAS09-SS02-1109	9.04	3.57	12.4	8.07	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO[3]**
Chrysene	20.0 - 20.0	4 / 5	4.60	43.0	CAS09-SS02-1109	16.6	16.0	31.8	11.6	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Dibenz(a,h)anthracene	20.0 - 22.0	1 / 5	5.00	5.00	CAS09-SS02-1109	9.50	2.55	11.9	9.13	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluoranthene	20.0 - 20.0	4 / 5	7.10	81.0	CAS09-SS02-1109	33.5	34.6	66.5	20.0	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	20.0 - 20.0	4 / 5	4.00	41.0	CAS09-SS02-1109	13.8	15.4	28.5	9.34	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
PAH (HMW)	90.0 - 90.0	4 / 5	57.7	337	CAS09-SS02-1109	128	122	244	95.3	18,000	0 / 5	0.02	--	-- / --	--	NO	--	--	NO
PAH (LMW)	90.0 - 90.0	4 / 5	83.9	162	CAS09-SS02-1109	104	47.8	150	94.7	29,000	0 / 5	0.01	--	-- / --	--	NO	--	--	NO
Phenanthrene	20.0 - 20.0	4 / 5	3.30	32.0	CAS09-SS02-1109	12.8	11.7	24.0	9.08	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pyrene	20.0 - 20.0	4 / 5	7.50	69.0	CAS09-SS02-1109	28.3	27.9	54.9	18.4	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDD	3.30 - 3.60	1 / 5	6.70	6.70	CAS09-SS03-1109	2.73	2.22	4.85	2.28	583	0 / 5	0.01	--	-- / --	--	NO	--	--	NO
4,4'-DDE	0.65 - 3.50	1 / 5	5.80	5.80	CAS09-SS02-1109	1.95	2.22	4.06	1.23	114	0 / 5	0.05	--	-- / --	--	NO	--	--	NO
4,4'-DDT	3.10 - 3.50	3 / 5	8.00	59.0	CAS09-SS02-1109	16.7	24.1	39.7	6.99	100	0 / 5	0.59	--	-- / --	--	NO	--	--	NO
alpha-Chlordane	1.80 - 1.90	1 / 5	0.48	0.48	CAS09-SS02-1109	0.83	0.19	1.01	0.80	11.0	0 / 5	0.04	--	-- / --	--	NO	--	--	NO
Aroclor-1260	10.0 - 10.0	11 / 16	9.50	760	CAS09-SS02-1109	95.2	188	177	28.2	8,000	0 / 16	0.10	--	-- / --	--	NO	--	--	NO
Dieldrin	3.50 - 3.60	2 / 5	1.60	11.0	CAS09-SS02-1109	3.58	4.15	7.54	2.50	10.5	1 / 5	1.05	--	-- / --	--	**YES**	0.72	0.34	NO
Endosulfan I	1.80 - 1.90	1 / 5	1.00	1.00	CAS09-SS02-1109	0.93	0.045	0.97	0.93	6.32	0 / 5	0.16	--	-- / --	--	NO	--	--	NO
Endosulfan II	3.50 - 3.50	4 / 5	1.10	10.0	CAS09-SS02-1109	3.21	3.80	6.84	2.18	6.32	1 / 5	1.58	--	-- / --	--	**YES**	1.08	0.51	NO
Endosulfan sulfate	3.50 - 3.50	3 / 5	4.60	30.0	CAS09-SS02-1109	9.38	11.9	20.7	5.18	6.32	2 / 5	4.75	--	-- / --	--	**YES**	3.28	1.48	**YES**
gamma-BHC (Lindane)	1.70 - 1.90	1 / 5	0.63	0.63	CAS09-SS04-1109	0.85	0.13	0.97	0.84	7.75	0 / 5	0.08	--	-- / --	--	NO	--	--	NO
gamma-Chlordane	1.80 - 1.90	3 / 5	0.91	7.60	CAS09-SS02-1109	2.29	2.97	5.12	1.45	11.0	0 / 5	0.69	--	-- / --	--	NO	--	--	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	5 / 5	4,490	12,900	CAS09-SS05-1109	8,358	3,523	11,716	7,723	pH < 5.5	0 / 5	--	--	-- / --	--	NO	--	--	NO
Antimony	-- - --	5 / 5	0.060	0.20	CAS09-SS02-1109	0.13	0.053	0.18	0.12	78.0	0 / 5	0.003	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	5 / 5	0.91	2.40	CAS09-SS05-1109	1.52	0.58	2.08	1.44	18.0	0 / 5	0.13	--	-- / --	--	NO	--	--	NO
Barium	-- - --	5 / 5	22.5	96.6	CAS09-SS04-1109	45.7	30.3	74.6	39.4	330	0 / 5	0.29	--	-- / --	--	NO	--	--	NO
Beryllium	-- - --	5 / 5	0.25	0.94	CAS09-SS02-1109	0.52	0.26	0.77	0.47	40.0	0 / 5	0.02	--	-- / --	--	NO	--	--	NO
Cadmium	1.00 - 1.00	4 / 5	0.030	1.00	CAS09-SS02-1109	0.40	0.37	0.76	0.24	32.0	0 / 5	0.03	--	-- / --	--	NO	--	--	NO
Calcium [2]	-- - --	5 / 5	536	5,520	CAS09-SS02-1109	2,393	2,125	4,419	1,601	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	5 / 5	5.90	18.7	CAS09-SS05-1109	13.0	6.22	19.0	11.6	64.0	0 / 5	0.29	--	-- / --	--	NO	--	--	NO
Cobalt	-- - --	5 / 5	1.00	4.30	CAS09-SS02-1109	2.64	1.32	3.90	2.34	13.0	0 / 5	0.33	--	-- / --	--	NO	--	--	NO
Copper	-- - --	5 / 5	3.80	512	CAS09-SS02-1109	122	219	330	29.1	70.0	1 / 5	7.31	4.25	4 / 5	120	**YES**	4.72	1.74	**YES**
Cyanide	0.77 - 0.84	1 / 5	0.28	0.28	CAS09-SS01-1009	0.37	0.053	0.42	0.37	15.8	0 / 5	0.02	--	-- / --	--	NO	--	--	NO
Iron	-- - --	5 / 5	4,450	13,700	CAS09-SS02-1109	9,144	4,255	13,201	8,230	5 < pH > 8	2 / 5	--	19,900	0 / 5	0.69	NO	--	--	NO

Table B-34
Ecological Screening Statistics - Site 9 Surface Soil - Site
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Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Lead	-- - --	5 / 5	6.00	39.0	CAS09-SS02-1109	19.1	12.3	30.8	16.0	120	0 / 5	0.33	--	-- / --	--	NO	--	--	NO
Magnesium [2]	-- - --	5 / 5	328	3,550	CAS09-SS02-1109	1,558	1,351	2,846	1,040	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Manganese	-- - --	5 / 5	47.5	295	CAS09-SS02-1109	142	94.4	232	119	220	1 / 5	1.34	324	0 / 5	0.91	NO	--	--	NO
Mercury	0.033 - 0.033	4 / 5	0.010	0.020	CAS09-SS02-1109	0.015	0.0050	0.020	0.015	0.10	0 / 5	0.20	--	-- / --	--	NO	--	--	NO
Nickel	-- - --	5 / 5	2.30	44.8	CAS09-SS02-1109	13.1	18.0	30.2	6.94	38.0	1 / 5	1.18	9.52	1 / 5	4.71	**YES**	0.79	0.34	NO
Potassium [2]	-- - --	5 / 5	232	2,040	CAS09-SS04-1109	1,068	803	1,834	747	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	-- - --	5 / 5	0.090	0.30	CAS09-SS05-1109	0.24	0.085	0.32	0.22	0.52	0 / 5	0.58	--	-- / --	--	NO	--	--	NO
Silver	1.20 - 1.50	2 / 5	0.070	0.13	CAS09-SS02-1109	0.44	0.32	0.74	0.31	560	0 / 5	0.0002	--	-- / --	--	NO	--	--	NO
Sodium [2]	-- - --	5 / 5	17.1	83.8	CAS09-SS02-1109	42.1	26.8	67.6	35.7	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Vanadium	-- - --	5 / 5	8.10	24.0	CAS09-SS05-1109	17.4	8.08	25.1	15.6	130	0 / 5	0.18	--	-- / --	--	NO	--	--	NO
Zinc	-- - --	5 / 5	8.00	119	CAS09-SS04-1109	58.7	48.2	105	37.5	120	0 / 5	0.99	--	-- / --	--	NO	--	--	NO
Other Parameters																			
pH --	- --	5 / 5	6.10	8.60	CAS09-SS02-1109	7.46	1.01	8.42	7.40	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	5 / 5	2,100	5,500	CAS09-SS05-1109	3,860	1,514	5,304	3,605	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-35
Exceedances - Site 9 Surface Soil - Site
Sites 4, 9, and AOC 3 Site Investigation Report
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Station ID	**Soil Screening Value**	**95% UTL**	CAS009-9S01	CAS009-9S02	CAS009-9S03	CAS009-9S04	CAS009-9S05	CAS009-9S06	CAS009-9S07	CAS009-9S08
Sample ID			CAS009-9S01-00-1286	CAS009-9S02-00-1286	CAS009-9S03-00-1286	CAS009-9S04-00-1286	CAS009-9S05-00-1286	CAS009-9S06-00-1286	CAS009-9S07-00-1286	CAS009-9S08-00-1286
Sample Date			12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Volatile Organic Compounds (UG/KG)										
Acetone	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	1,250	--	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	40,000	--	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/KG)										
Acenaphthene	LMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	LMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	LMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	LMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
PAH (HMW)	18,000	--	NA	NA	NA	NA	NA	NA	NA	NA
PAH (LMW)	29,000	--	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	LMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	HMW PAH	--	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	583	--	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	114	--	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	100	--	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	11.0	--	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	8,000	--	10 U	10 U	10 U	**41**	**35**	**22**	10 U	10 U
Dieldrin	10.5	--	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	6.32	--	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	6.32	--	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	6.32	--	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	7.75	--	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	11.0	--	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin/Furans (PG/G)										
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)										
Aluminum	pH < 5.5	12,200	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	78.0	11.0	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	18.0	6.36	NA	NA	NA	NA	NA	NA	NA	NA
Barium	330	52.9	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	40.0	0.587	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	32.0	1.50	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	64.0	18.2	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	13.0	9.93	NA	NA	NA	NA	NA	NA	NA	NA
Copper	70.0	4.25	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	15.8	--	NA	NA	NA	NA	NA	NA	NA	NA
Iron	5 < pH > 8	19,900	NA	NA	NA	NA	NA	NA	NA	NA
Lead	120	17.4	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	220	324	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.10	0.111	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	38.0	9.52	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.52	0.51	NA	NA	NA	NA	NA	NA	NA	NA
Silver	560	2.10	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	130	27.9	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	120	26.5	NA	NA	NA	NA	NA	NA	NA	NA

Table B-35
Exceedances - Site 9 Surface Soil - Site
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS009-9S01	CAS009-9S02	CAS009-9S03	CAS009-9S04	CAS009-9S05	CAS009-9S06	CAS009-9S07	CAS009-9S08
Sample ID			CAS009-9S01-00-1286	CAS009-9S02-00-1286	CAS009-9S03-00-1286	CAS009-9S04-00-1286	CAS009-9S05-00-1286	CAS009-9S06-00-1286	CAS009-9S07-00-1286	CAS009-9S08-00-1286
Sample Date			12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Other Parameters										
pH	--	--	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC) (MG/KG)	--	--	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

Table B-35
Exceedances - Site 9 Surface Soil - Site
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Soil Screening Value	95% UTL	CAS009-9S09	CAS009-9S10	CAS009-9S11	CAS09-SS01	CAS09-SS02	CAS09-SS03	CAS09-SS04	CAS09-SS05	
Sample ID			CAS009-9S09-00-1286	CAS009-9S10-00-1286	CAS009-9S11-00-1286	CAS09-SS01-1009	CAS09-SS02-1109	CAS09-SS03-1109	CAS09-SS04-1109	CAS09-SS05-1109	CAS09-SS05P-1109
Sample Date			12/25/86	12/25/86	12/25/86	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Volatile Organic Compounds (UG/KG)											
Acetone	--	--	NA	NA	NA	66 B	82 B	52 B	68 B	140	100
Methylene chloride	1,250	--	NA	NA	NA	24 UJ	20 J	9 J	27 UJ	25 J	50
Toluene	40,000	--	NA	NA	NA	2 J	4 UJ	5 U	5 UJ	5 U	5 U
Semivolatile Organic Compounds (UG/KG)											
Acenaphthene	LMW PAH	--	NA	NA	NA	20 U	1.7 J	21 U	22 U	22 U	21 U
Acenaphthylene	LMW PAH	--	NA	NA	NA	20 U	1.2 J	21 U	22 U	22 U	21 U
Anthracene	LMW PAH	--	NA	NA	NA	20 U	6.5 J	21 U	2.1 J	22 U	21 U
Benzo(a)anthracene	HMW PAH	--	NA	NA	NA	20 U	40	3.4 J	12 J	22 U	4.4 J
Benzo(a)pyrene	HMW PAH	--	NA	NA	NA	20 U	39	21 U	8.1 J	22 U	3.9 J
Benzo(b)fluoranthene	HMW PAH	--	NA	NA	NA	20 U	61	5.5 J	18 J	22 U	7 J
Benzo(g,h,i)perylene	HMW PAH	--	NA	NA	NA	20 U	15 J	21 U	3.2 L	22 U	2.5 J
Benzo(k)fluoranthene	HMW PAH	--	NA	NA	NA	20 U	24	21 U	6.9 J	22 U	21 U
Carbazole	--	--	NA	NA	NA	20 U	2.7 J	21 U	22 U	22 U	21 U
Chrysene	HMW PAH	--	NA	NA	NA	20 U	43	4.6 J	20 L	22 U	5.4 J
Dibenz(a,h)anthracene	HMW PAH	--	NA	NA	NA	20 U	5 J	21 U	22 U	22 U	21 U
Fluoranthene	LMW PAH	--	NA	NA	NA	20 U	81	7.1 J	60 L	22 U	9.2 J
Indeno(1,2,3-cd)pyrene	HMW PAH	--	NA	NA	NA	20 U	41	4 J	9.2 J	22 U	4.7 J
PAH (HMW)	18,000	--	NA	NA	NA	90 U	337	67	134	99 U	57.7
PAH (LMW)	29,000	--	NA	NA	NA	90 U	162	83.9	143	99 U	86.6
Phenanthrene	LMW PAH	--	NA	NA	NA	20 U	32	3.3 J	15 J	22 U	3.9 J
Pyrene	HMW PAH	--	NA	NA	NA	20 U	69	7.5 J	46 L	22 U	8.8 J
Pesticide/Polychlorinated Biphenyls (UG/KG)											
4,4'-DDD	583	--	NA	NA	NA	3.5 U	3.3 U	6.7 J	3.6 U	3.5 U	3.1 U
4,4'-DDE	114	--	NA	NA	NA	0.65 B	5.8 J	2.1 B	1.6 B	3.5 U	1.5 B
4,4'-DDT	100	--	NA	NA	NA	3.5 U	59 J	8 J	13	0.9 B	3.1 U
alpha-Chlordane	11.0	--	NA	NA	NA	1.8 U	0.48 J	1.9 U	1.8 U	1.8 U	1.6 U
Aroclor-1260	8,000	--	195	21	29	9.5 J	760	86	150	19 U	150
Dieldrin	10.5	--	NA	NA	NA	3.5 U	11 J	3.6 U	1.6 J	3.5 U	3.1 U
Endosulfan I	6.32	--	NA	NA	NA	1.8 U	1 J	1.9 U	1.8 U	1.8 U	1.6 U
Endosulfan II	6.32	--	NA	NA	NA	3.5 U	10 J	1.1 J	1.5 J	3.5 U	1.7 J
Endosulfan sulfate	6.32	--	NA	NA	NA	3.5 U	30 J	4.6 J	8.8 J	3.5 U	3.1 U
gamma-BHC (Lindane)	7.75	--	NA	NA	NA	1.8 U	1.7 U	1.9 U	0.63 J	1.8 U	1.6 U
gamma-Chlordane	11.0	--	NA	NA	NA	1.8 U	7.6 J	1.9 U	0.91 J	1.8 U	1.1 J
Dioxin/Furans (PG/G)											
No Detections	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics (MG/KG)											
Aluminum	pH < 5.5	12,200	NA	NA	NA	4,490	9,680	5,090	9,630	9,780	12,900
Antimony	78.0	11.0	NA	NA	NA	0.06 L	0.2 L	0.1 L	0.14 L	0.14 L	0.15 L
Arsenic	18.0	6.36	NA	NA	NA	1.1	1.5	0.91	1.7	1.9	2.4
Barium	330	52.9	NA	NA	NA	26.3	33.7	22.5	96.6	49.5	48.2
Beryllium	40.0	0.587	NA	NA	NA	0.35 J	0.94	0.25 J	0.55	0.49	0.51
Cadmium	32.0	1.50	NA	NA	NA	1 U	1	0.2 J	0.28 J	0.03 J	0.02 J
Chromium	64.0	18.2	NA	NA	NA	5.9 K	18.5 K	6.9 K	15.1 K	15.1 K	18.7 K
Cobalt	13.0	9.93	NA	NA	NA	1.7	4.3	1	3.4	2.7	2.8
Copper	70.0	4.25	NA	NA	NA	3.8 K	512 K	5.9 K	37.9 K	46.9 K	48.1 K
Cyanide	15.8	--	NA	NA	NA	0.28 J	0.77 U	0.77 U	0.77 U	0.84 U	0.84 U
Iron	5 < pH > 8	19,900	NA	NA	NA	4,770	13,700	4,450	11,000	11,000	11,800
Lead	120	17.4	NA	NA	NA	6 K	39 K	18.4 K	19.2 K	12.7 K	11.3 K
Manganese	220	324	NA	NA	NA	91.8 K	295 K	47.5 K	159 K	119 K	102 K
Mercury	0.10	0.111	NA	NA	NA	0.033 U	0.02 J	0.01 J	0.02 J	0.01 J	0.01 J
Nickel	38.0	9.52	NA	NA	NA	2.3 J	44.8 J	2.6 J	9 J	6 J	6.7 J
Selenium	0.52	0.51	NA	NA	NA	0.25 J	0.25 J	0.09 J	0.29 J	0.18 J	0.3 J
Silver	560	2.10	NA	NA	NA	1.5 U	0.13 J	1.2 U	1.3 U	0.06 J	0.07 J
Vanadium	130	27.9	NA	NA	NA	8.1	22	9.1	23.8	20.6	24
Zinc	120	26.5	NA	NA	NA	8 K	91.7 K	13.9 K	119 K	61.1 K	55.1 K

Table B-35
Exceedances - Site 9 Surface Soil - Site
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS009-9S09	CAS009-9S10	CAS009-9S11	CAS09-SS01	CAS09-SS02	CAS09-SS03	CAS09-SS04	CAS09-SS05	
Sample ID			CAS009-9S09-00-1286	CAS009-9S10-00-1286	CAS009-9S11-00-1286	CAS09-SS01-1009	CAS09-SS02-1109	CAS09-SS03-1109	CAS09-SS04-1109	CAS09-SS05-1109	CAS09-SS05P-1109
Sample Date			12/25/86	12/25/86	12/25/86	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Other Parameters											
pH	--	--	NA	NA	NA	**7.0**	**8.6**	**6.1**	**8.3**	**7.3**	**7.2**
Total organic carbon (TOC) (MG/KG)	--	--	NA	NA	NA	**2,100**	**2,600**	**3,900**	**5,200**	**5,500**	**5,300**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

Table B-36
Ecological Screening Statistics - Site 9 Subsurface Soil - Site
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
Acetone	40.0 - 68.0	2 / 5	86.0	93.0	CAS09-SB01-1009	51.0	35.6	85.0	41.3	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO**[3]
Methylene chloride	22.0 - 25.0	1 / 5	54.0	54.0	CAS09-SB05-1109	20.4	18.8	38.3	16.2	1,250	0 / 5	0.04	--	-- / --	--	NO	--	--	NO
Toluene	5.00 - 5.00	3 / 5	2.00	2.00	CAS09-SB01-1009	2.20	0.27	2.46	2.19	40,000	0 / 5	0.0001	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
Benzo(a)anthracene	11.0 - 23.0	1 / 5	4.80	4.80	CAS09-SB05-1109	8.46	3.12	11.4	7.95	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)pyrene	19.0 - 23.0	1 / 5	4.70	4.70	CAS09-SB05-1109	9.54	2.81	12.2	9.09	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(b)fluoranthene	19.0 - 23.0	3 / 5	2.60	11.0	CAS09-SB05-1109	8.46	3.59	11.9	7.52	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(g,h,i)perylene	19.0 - 23.0	1 / 5	8.80	8.80	CAS09-SB04-1109	10.4	1.15	11.5	10.3	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
bis(2-Ethylhexyl)phthalate	93.0 - 120	1 / 5	59.0	59.0	CAS09-SB05-1109	55.1	5.32	60.2	54.9	30,000	0 / 5	0.002	--	-- / --	--	NO	--	--	NO
Chrysene	19.0 - 23.0	2 / 5	1.90	6.40	CAS09-SB05-1109	8.06	3.98	11.9	6.81	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Dibenz(a,h)anthracene	19.0 - 23.0	1 / 5	12.0	12.0	CAS09-SB04-1109	11.0	0.94	11.9	11.0	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluoranthene	4.90 - 23.0	2 / 5	3.30	10.0	CAS09-SB05-1109	7.35	4.16	11.3	6.15	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	19.0 - 23.0	2 / 5	4.80	7.60	CAS09-SB04-1109	8.88	2.74	11.5	8.48	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
PAH (HMW)	85.5 - 104	3 / 5	70.6	88.9	CAS09-SB04-1109	65.5	18.3	82.9	63.3	18,000	0 / 5	0.005	--	-- / --	--	NO	--	--	NO
PAH (LMW)	85.5 - 104	3 / 5	62.3	92.0	CAS09-SB05-1109	68.0	22.7	89.6	65.0	29,000	0 / 5	0.003	--	-- / --	--	NO	--	--	NO
Phenanthrene	19.0 - 23.0	2 / 5	2.80	5.00	CAS09-SB05-1109	7.96	3.86	11.6	7.00	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pyrene	19.0 - 23.0	2 / 5	2.80	9.20	CAS09-SB05-1109	8.80	3.49	12.1	7.91	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDD	3.20 - 3.80	1 / 5	3.10	3.10	CAS09-SB02-1109	2.01	0.62	2.60	1.95	583	0 / 5	0.01	--	-- / --	--	NO	--	--	NO
4,4'-DDT	0.92 - 3.80	1 / 5	8.40	8.40	CAS09-SB05-1109	2.60	3.31	5.75	1.47	100	0 / 5	0.08	--	-- / --	--	NO	--	--	NO
Aroclor-1260	17.0 - 21.0	2 / 5	41.0	100	CAS09-SB05-1109	33.9	39.4	71.5	20.3	8,000	0 / 5	0.01	--	-- / --	--	NO	--	--	NO
Dieldrin	3.20 - 3.80	1 / 5	1.40	1.40	CAS09-SB05-1109	1.67	0.19	1.85	1.66	10.5	0 / 5	0.13	--	-- / --	--	NO	--	--	NO
Endosulfan II	3.20 - 3.80	2 / 5	0.76	1.10	CAS09-SB05-1109	1.42	0.48	1.88	1.35	6.32	0 / 5	0.17	--	-- / --	--	NO	--	--	NO
Endosulfan sulfate	3.20 - 3.80	2 / 5	0.76	6.40	CAS09-SB05-1109	2.47	2.24	4.61	1.91	6.32	1 / 5	1.01	--	-- / --	--	**YES**	0.73	0.39	NO
gamma-Chlordane	1.60 - 2.00	1 / 5	0.84	0.84	CAS09-SB05-1109	0.89	0.076	0.96	0.89	11.0	0 / 5	0.08	--	-- / --	--	NO	--	--	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	5 / 5	7,180	27,300	CAS09-SB01-1009	16,276	7,865	23,774	14,664	pH < 5.5	0 / 5	--	--	-- / --	--	NO	--	--	NO
Antimony	-- - --	5 / 5	0.070	0.22	CAS09-SB01-1009	0.14	0.058	0.20	0.13	78.0	0 / 5	0.003	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	5 / 5	1.60	7.10	CAS09-SB01-1009	3.92	2.08	5.91	3.48	18.0	0 / 5	0.39	--	-- / --	--	NO	--	--	NO
Barium	-- - --	5 / 5	28.4	48.2	CAS09-SB02-1109	38.8	7.76	46.2	38.2	330	0 / 5	0.15	--	-- / --	--	NO	--	--	NO
Beryllium	-- - --	5 / 5	0.39	0.59	CAS09-SB01-1009	0.50	0.092	0.58	0.49	40.0	0 / 5	0.01	--	-- / --	--	NO	--	--	NO
Calcium [2]	-- - --	5 / 5	667	1,970	CAS09-SB02-1109	1,479	568	2,021	1,372	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	5 / 5	10.6	40.7	CAS09-SB01-1009	23.7	11.6	34.7	21.4	64.0	0 / 5	0.64	--	-- / --	--	NO	--	--	NO
Cobalt	-- - --	5 / 5	1.90	4.70	CAS09-SB01-1009	3.16	1.09	4.20	3.01	13.0	0 / 5	0.36	--	-- / --	--	NO	--	--	NO
Copper	-- - --	5 / 5	3.80	106	CAS09-SB02-1109	25.9	44.8	68.6	10.0	70.0	1 / 5	1.51	3.17	5 / 5	33.4	**YES**	0.98	0.37	NO
Cyanide	0.77 - 0.84	1 / 5	0.36	0.36	CAS09-SB01-1009	0.39	0.026	0.42	0.39	15.8	0 / 5	0.02	--	-- / --	--	NO	--	--	NO
Iron	-- - --	5 / 5	8,400	28,700	CAS09-SB01-1009	18,100	7,775	25,512	16,646	5 < pH > 8	0 / 5	--	--	-- / --	--	NO	--	--	NO
Lead	-- - --	5 / 5	6.90	10.2	CAS09-SB02-1109	8.28	1.52	9.72	8.17	120	0 / 5	0.09	--	-- / --	--	NO	--	--	NO
Magnesium [2]	-- - --	5 / 5	468	1,740	CAS09-SB01-1009	1,152	563	1,689	1,030	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Manganese	-- - --	5 / 5	34.3	106	CAS09-SB02-1109	67.6	31.3	97.5	61.2	220	0 / 5	0.48	--	-- / --	--	NO	--	--	NO
Mercury	0.032 - 0.036	3 / 5	0.010	0.050	CAS09-SB05-1109	0.027	0.017	0.043	0.022	0.10	0 / 5	0.50	--	-- / --	--	NO	--	--	NO
Nickel	-- - --	5 / 5	3.30	13.2	CAS09-SB02-1109	7.64	4.04	11.5	6.78	38.0	0 / 5	0.35	--	-- / --	--	NO	--	--	NO
Potassium [2]	-- - --	5 / 5	297	879	CAS09-SB01-1009	607	237	833	566	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	-- - --	5 / 5	0.19	0.37	CAS09-SB02-1109	0.31	0.079	0.38	0.30	0.52	0 / 5	0.71	--	-- / --	--	NO	--	--	NO
Sodium [2]	-- - --	5 / 5	20.8	51.4	CAS09-SB02-1109	37.1	11.4	48.0	35.6	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO

Table B-36
Ecological Screening Statistics - Site 9 Subsurface Soil - Site
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Vanadium	-- - --	5 / 5	14.1	52.2	CAS09-SB01-1009	31.0	14.7	45.0	28.1	130	0 / 5	0.40	--	-- / --	--	NO	--	--	NO
Zinc	-- - --	5 / 5	9.10	34.0	CAS09-SB02-1109	19.3	9.34	28.2	17.6	120	0 / 5	0.28	--	-- / --	--	NO	--	--	NO
Other Parameters																			
pH --	- --	5 / 5	6.20	8.00	CAS09-SB05-1109	7.14	0.65	7.76	7.12	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	5 / 5	1,500	2,700	CAS09-SB03-1109	2,000	442	2,421	1,963	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-37
Exceedances - Site 9 Subsurface Soil - Site
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Cheatham Annex, Williamsburg, Virginia

Station ID	Soil Screening Value	95% UTL	CAS09-SB01	CAS09-SB02	CAS09-SB03	CAS09-SB04	CAS09-SB05	
Sample ID			CAS09-SB01-1009	CAS09-SB02-1109	CAS09-SB03-1109	CAS09-SB04-1109	CAS09-SB05-1109	CAS09-SB05P-1109
Sample Date			10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Volatile Organic Compounds (UG/KG)								
Acetone	--	--	**93 J**	44 B	40 B	68 B	**86**	**80**
Methylene chloride	1,250	--	25 UJ	24 U	22 U	25 UJ	**43**	**54**
Toluene	40,000	--	**2 J**	5 U	**2 J**	**2 J**	5 U	5 U
Semivolatile Organic Compounds (UG/KG)								
Benzo(a)anthracene	HMW PAH	--	23 U	22 U	19 U	11 B	**4.8 J**	22 U
Benzo(a)pyrene	HMW PAH	--	23 U	22 U	19 U	22 U	**4.7 J**	22 U
Benzo(b)fluoranthene	HMW PAH	--	23 U	**2.6 J**	19 U	**11 J**	**7.7 J**	22 U
Benzo(g,h,i)perylene	HMW PAH	--	23 U	22 U	19 U	**8.8 L**	22 U	22 U
bis(2-Ethylhexyl)phthalate	30,000	--	120 U	110 U	93 U	110 U	**59 J**	110 U
Chrysene	HMW PAH	--	23 U	**1.9 J**	19 U	22 U	**6.4 J**	22 U
Dibenz(a,h)anthracene	HMW PAH	--	23 U	22 U	19 U	**12 J**	22 U	22 U
Fluoranthene	LMW PAH	--	23 U	**3.3 J**	19 U	4.9 B	**10 J**	22 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	23 U	22 U	19 U	**7.6 J**	**4.8 J**	22 U
PAH (HMW)	18,000	--	104 U	**73.3**	85.5 U	**88.9**	**70.6**	99 U
PAH (LMW)	29,000	--	104 U	**91.3**	85.5 U	**62.3**	**92**	99 U
Phenanthrene	LMW PAH	--	23 U	22 U	19 U	**2.8 J**	**5 J**	22 U
Pyrene	HMW PAH	--	23 U	**2.8 J**	19 U	22 U	**9.2 J**	22 U
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	583	--	3.8 UJ	**3.1 J**	3.2 U	3.5 U	3.2 U	3.4 U
4,4'-DDT	100	--	3.8 UJ	3.4 U	0.92 B	1.1 B	**8.4**	3.4 U
Aroclor-1260	8,000	--	21 U	**41**	17 U	19 U	**100**	19 U
Dieldrin	10.5	--	3.8 UJ	3.4 U	3.2 U	3.5 U	**1.4 J**	3.4 U
Endosulfan II	6.32	--	3.8 UJ	**0.76 J**	3.2 U	3.5 U	**1.1 J**	3.4 U
Endosulfan sulfate	6.32	--	3.8 UJ	3.4 U	3.2 U	**0.76 J**	**6.4 J**	3.4 U
gamma-Chlordane	11.0	--	2 UJ	1.8 U	1.6 U	1.8 U	**0.84 J**	1.8 U
Inorganics (MG/KG)								
Aluminum	pH < 5.5	13,000	**27,300**	**18,900**	**7,180**	**10,400**	**17,000**	**17,600**
Antimony	78.0	--	**0.22 L**	**0.16 L**	**0.07 L**	**0.1 L**	**0.13 L**	**0.15 L**
Arsenic	18.0	5.54	**7.1**	**4**	**1.6**	**2.6**	**4.1**	**4.3**
Barium	330	84.5	**35.3**	**48.2**	**28.4**	**37.8**	**44.4**	**38.7**
Beryllium	40.0	0.52	**0.59**	**0.59**	**0.39 J**	**0.48**	**0.43 J**	**0.42 J**
Chromium	64.0	33.7	**40.7 K**	**26.9 K**	**10.6 K**	**15.6 K**	**23.4 K**	**24.6 K**
Cobalt	13.0	5.18	**4.7**	**3.6**	**1.9**	**2.4**	**3.1**	**3.2**
Copper	70.0	3.17	**5.9 K**	**106 K**	**3.8 K**	**8.9 K**	**4.8 K**	**3.9 K**
Cyanide	15.8	2.70	**0.36 J**	0.84 U	0.77 U	0.77 U	0.84 U	0.77 U
Iron	5 < pH > 8	32,000	**28,700**	**20,700**	**8,400**	**13,000**	**19,400**	**19,700**
Lead	120	8.79	**9.6 K**	**10.2 K**	**7.6 K**	**6.9 K**	**7.1 K**	**7 K**
Manganese	220	176	**34.3 K**	**106 K**	**83.4 K**	**78.1 K**	**36.4 K**	**34.1 K**
Mercury	0.10	0.14	**0.04**	**0.01 J**	0.036 U	0.032 U	**0.02 J**	**0.05**
Nickel	38.0	17.6	**10.3 J**	**13.2 J**	**3.3 J**	**5 J**	**5.8 J**	**6.4 J**
Selenium	0.52	0.64	**0.34 J**	**0.37 J**	**0.26 J**	**0.19 J**	**0.33 J**	**0.37 J**
Vanadium	130	48.3	**52.2**	**34.1**	**14.1**	**20.5**	**32.5**	**34.1**
Zinc	120	28.0	**21.7 K**	**34 K**	**9.1 K**	**16.5 K**	**15.4 K**	**14.7 K**
Other Parameters								
pH	--	--	**6.2**	**7.3**	**7.0**	**7.2**	**8.0**	**7.3**
Total organic carbon (TOC) (MG/KG)	--	--	**1,800**	**1,500**	**2,700**	**2,000**	**1,500**	**2,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

Table B-38
Ecological Screening Statistics - Site 9 Surface Soil - Ditch
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
Tetrachloroethene	-- - --	3 / 3	2.00	15.0	CAS09-SD03-1209A	7.33	6.81	18.8	5.31	179	0 / 3	0.08	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
Acenaphthene	23.0 - 26.0	1 / 3	20.0	20.0	CAS09-SD01-1209A	14.8	4.54	22.5	14.4	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Acenaphthylene	23.0 - 23.0	2 / 3	1.80	9.50	CAS09-SD01-1209A	7.60	5.12	16.2	5.82	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Anthracene	23.0 - 26.0	1 / 3	40.0	40.0	CAS09-SD01-1209A	21.5	16.0	48.5	18.2	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)anthracene	17.0 - 27.0	1 / 3	260	260	CAS09-SD01-1209A	94.0	144	336	31.0	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)pyrene	-- - --	3 / 3	11.0	210	CAS09-SD01-1209A	80.0	113	270	35.3	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(b)fluoranthene	26.0 - 26.0	2 / 3	49.0	370	CAS09-SD01-1209A	144	197	475	61.8	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(g,h,i)perylene	23.0 - 23.0	2 / 3	4.10	38.0	CAS09-SD01-1209A	17.9	17.8	47.9	12.1	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(k)fluoranthene	-- - --	3 / 3	5.20	110	CAS09-SD01-1209A	43.1	58.1	141	20.0	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
bis(2-Ethylhexyl)phthalate	120 - 130	1 / 3	63.0	63.0	CAS09-SD01-1209A	62.7	2.52	66.9	62.6	30,000	0 / 3	0.002	--	-- / --	--	NO	--	--	NO
Carbazole	6.30 - 6.80	1 / 3	52.0	52.0	CAS09-SD01-1209A	19.5	28.1	66.9	8.23	NSV	-- / --	NSV	--	-- / --	--	**YES**	NSV	NSV	**NO[3]**
Chrysene	-- - --	3 / 3	6.40	290	CAS09-SD01-1209A	105	160	375	33.4	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Dibenz(a,h)anthracene	23.0 - 23.0	2 / 3	14.0	78.0	CAS09-SD01-1209A	34.5	37.7	98.0	23.2	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluoranthene	-- - --	3 / 3	26.0	560	CAS09-SD01-1209A	211	303	721	87.5	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluorene	23.0 - 26.0	1 / 3	27.0	27.0	CAS09-SD01-1209A	17.2	8.55	31.6	15.9	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	-- - --	3 / 3	12.0	190	CAS09-SD01-1209A	74.0	101	243	35.7	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Naphthalene	23.0 - 26.0	1 / 3	14.0	14.0	CAS09-SD01-1209A	12.8	1.26	15.0	12.8	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
PAH (HMW)	-- - --	3 / 3	99.1	1,916	CAS09-SD01-1209A	733	1,025	2,462	327	18,000	0 / 3	0.11	--	-- / --	--	NO	--	--	NO
PAH (LMW)	-- - --	3 / 3	121	1,019	CAS09-SD01-1209A	428	512	1,291	260	29,000	0 / 3	0.04	--	-- / --	--	NO	--	--	NO
Phenanthrene	-- - --	3 / 3	14.0	320	CAS09-SD01-1209A	117	176	413	43.2	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pyrene	-- - --	3 / 3	20.0	370	CAS09-SD01-1209A	140	199	476	61.2	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDD	4.50 - 4.50	2 / 3	40.0	370	CAS09-SD01-1209A	137	202	478	32.2	583	0 / 3	0.63	--	-- / --	--	NO	--	--	NO
4,4'-DDE	2.70 - 2.70	2 / 3	24.0	52.0	CAS09-SD01-1209A	25.8	25.4	68.6	11.9	114	0 / 3	0.46	--	-- / --	--	NO	--	--	NO
4,4'-DDT	-- - --	3 / 3	44.0	800	CAS09-SD01-1209A	465	385	1,114	269	100	2 / 3	8.00	--	-- / --	--	**YES**	11.1	4.65	**YES**
alpha-Chlordane	2.00 - 2.00	2 / 3	1.50	2.30	CAS09-SD01-1209A	1.60	0.66	2.71	1.51	11.0	0 / 3	0.21	--	-- / --	--	NO	--	--	NO
Aroclor-1260	-- - --	5 / 5	82.0	9,700	CAS09-SD01-1209A	3,589	4,566	7,942	1,001	8,000	1 / 5	1.21	--	-- / --	--	**YES**	0.99	0.45	**YES[3]**
Dieldrin	4.50 - 4.50	2 / 3	6.80	140	CAS09-SD01-1209A	49.7	78.2	182	12.9	10.5	1 / 3	13.3	--	-- / --	--	**YES**	17.3	4.73	**YES**
Endosulfan II	-- - --	3 / 3	5.50	90.0	CAS09-SD01-1209A	58.5	46.2	136	34.1	6.32	2 / 3	14.2	--	-- / --	--	**YES**	21.6	9.26	**YES**
Endosulfan sulfate	4.50 - 4.50	2 / 3	29.0	540	CAS09-SD01-1209A	190	303	701	32.8	6.32	2 / 3	85.4	--	-- / --	--	**YES**	111	30.1	**YES**
Endrin ketone	3.80 - 4.50	1 / 3	620	620	CAS09-SD01-1209A	208	357	809	13.8	1.95	1 / 3	318	--	-- / --	--	**YES**	415	107	**YES**
gamma-Chlordane	-- - --	3 / 3	3.20	78.0	CAS09-SD01-1209A	44.4	38.0	108	23.5	11.0	2 / 3	7.09	--	-- / --	--	**YES**	9.86	4.04	**YES**
Inorganics (MG/KG)																			
Aluminum	-- - --	3 / 3	10,100	26,000	CAS09-SD03-1209A	19,200	8,196	33,017	17,806	pH < 5.5	0 / 3	--	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	3 / 3	3.10	6.50	CAS09-SD03-1209A	5.27	1.88	8.44	5.00	18.0	0 / 3	0.36	--	-- / --	--	NO	--	--	NO
Barium	-- - --	3 / 3	44.8	60.7	CAS09-SD02-1209A	54.9	8.75	69.6	54.4	330	0 / 3	0.18	--	-- / --	--	NO	--	--	NO
Beryllium	-- - --	3 / 3	0.57	0.83	CAS09-SD03-1209A	0.67	0.14	0.91	0.66	40.0	0 / 3	0.02	--	-- / --	--	NO	--	--	NO
Cadmium	-- - --	3 / 3	0.24	0.74	CAS09-SD01-1209A	0.45	0.26	0.89	0.41	32.0	0 / 3	0.02	--	-- / --	--	NO	--	--	NO
Calcium [2]	-- - --	3 / 3	1,580	2,160	CAS09-SD03-1209A	1,883	291	2,374	1,868	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	3 / 3	16.8	37.5	CAS09-SD03-1209A	28.7	10.7	46.7	27.1	64.0	0 / 3	0.59	--	-- / --	--	NO	--	--	NO
Cobalt	-- - --	3 / 3	3.00	4.00	CAS09-SD03-1209A	3.53	0.50	4.38	3.51	13.0	0 / 3	0.31	--	-- / --	--	NO	--	--	NO
Copper	-- - --	3 / 3	9.90	55.1	CAS09-SD01-1209A	27.1	24.5	68.3	20.7	70.0	0 / 3	0.79	--	-- / --	--	NO	--	--	NO
Iron	-- - --	3 / 3	10,500	25,200	CAS09-SD03-1209A	19,133	7,679	32,079	17,907	5 < pH > 8	0 / 3	--	--	-- / --	--	NO	--	--	NO
Lead	-- - --	3 / 3	33.9	64.8	CAS09-SD01-1209A	46.3	16.3	73.8	44.6	120	0 / 3	0.54	--	-- / --	--	NO	--	--	NO
Magnesium [2]	-- - --	3 / 3	1,510	1,830	CAS09-SD03-1209A	1,637	170	1,923	1,631	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO

Table B-38
Ecological Screening Statistics - Site 9 Surface Soil - Ditch
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Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Manganese	-- - --	3 / 3	35.8	135	CAS09-SD01-1209A	71.0	55.5	165	58.8	220	0 / 3	0.61	--	-- / --	--	NO	--	--	NO
Mercury	-- - --	3 / 3	0.070	0.26	CAS09-SD01-1209A	0.17	0.095	0.33	0.15	0.10	2 / 3	2.60	0.111	2 / 3	2.34	**YES**	3.31	1.70	**YES**
Nickel	-- - --	3 / 3	9.00	10.4	CAS09-SD03-1209A	9.50	0.78	10.8	9.48	38.0	0 / 3	0.27	--	-- / --	--	NO	--	--	NO
Potassium [2]	-- - --	3 / 3	686	1,060	CAS09-SD03-1209A	821	207	1,171	805	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	0.90 - 1.50	1 / 3	0.65	0.65	CAS09-SD03-1209A	0.62	0.15	0.87	0.60	0.52	1 / 3	1.25	0.51	1 / 3	1.27	**YES**	1.68	1.19	**YES**
Vanadium	-- - --	3 / 3	24.6	48.2	CAS09-SD03-1209A	39.0	12.7	60.4	37.5	130	0 / 3	0.37	--	-- / --	--	NO	--	--	NO
Zinc	-- - --	3 / 3	46.2	104	CAS09-SD01-1209A	68.0	31.4	121	63.7	120	0 / 3	0.87	--	-- / --	--	NO	--	--	NO
Other Parameters																			
pH --	- --	3 / 3	6.10	6.30	CAS09-SD03-1209A	6.17	0.12	6.36	6.17	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	3 / 3	8,100	25,000	CAS09-SD01-1209A	15,367	8,695	30,025	13,808	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC
3 - See text

Table B-39
Exceedances - Site 9 Surface Soil - Ditch
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS009-9S12	CAS009-9S13	CAS09-SD01	CAS09-SD02	CAS09-SD03
Sample ID			CAS009-9S12-00-1286	CAS009-9S13-00-1286	CAS09-SD01-1209A	CAS09-SD02-1209A	CAS09-SD03-1209A
Sample Date			12/25/86	12/25/86	12/09/09	12/09/09	12/09/09
Volatile Organic Compounds (UG/KG)							
Tetrachloroethene	179	--	NA	NA	**2 J**	**5 J**	**15 J**
Semivolatile Organic Compounds (UG/KG)							
Acenaphthene	LMW PAH	--	NA	NA	**20 J**	23 U	26 U
Acenaphthylene	LMW PAH	--	NA	NA	**9.5 J**	23 U	**1.8 J**
Anthracene	LMW PAH	--	NA	NA	**40**	23 U	26 U
Benzo(a)anthracene	HMW PAH	--	NA	NA	**260**	17 B	27 B
Benzo(a)pyrene	HMW PAH	--	NA	NA	**210**	**11 J**	**19 J**
Benzo(b)fluoranthene	HMW PAH	--	NA	NA	**370**	26 B	**49**
Benzo(g,h,i)perylene	HMW PAH	--	NA	NA	**38**	23 UL	**4.1 J**
Benzo(k)fluoranthene	HMW PAH	--	NA	NA	**110**	**5.2 J**	**14 J**
bis(2-Ethylhexyl)phthalate	30,000	--	NA	NA	**63 J**	120 U	130 U
Carbazole	--	--	NA	NA	**52**	6.3 B	6.8 B
Chrysene	HMW PAH	--	NA	NA	**290**	**6.4 J**	**20 J**
Dibenz(a,h)anthracene	HMW PAH	--	NA	NA	**78 J**	23 U	**14 J**
Fluoranthene	LMW PAH	--	NA	NA	**560**	**26 K**	**46**
Fluorene	LMW PAH	--	NA	NA	**27 J**	23 U	26 U
Indeno(1,2,3-cd)pyrene	HMW PAH	--	NA	NA	**190**	**12 J**	**20 J**
Naphthalene	LMW PAH	--	NA	NA	**14 J**	23 U	26 U
PAH (HMW)	18,000	--	NA	NA	**1,916**	**99.1**	**185**
PAH (LMW)	29,000	--	NA	NA	**1,019**	**121**	**144**
Phenanthrene	LMW PAH	--	NA	NA	**320**	**14 J**	**18 J**
Pyrene	HMW PAH	--	NA	NA	**370**	**20 J**	**31**
Pesticide/Polychlorinated Biphenyls (UG/KG)							
4,4'-DDD	583	--	NA	NA	**370 J**	**40 J**	4.5 U
4,4'-DDE	114	--	NA	NA	**52 J**	2.7 B	**24 J**
4,4'-DDT	100	--	NA	NA	**800**	**44 J**	**550**
alpha-Chlordane	11.0	--	NA	NA	**2.3 J**	2 UJ	**1.5 J**
Aroclor-1260	8,000	--	**321**	**82**	**9,700 J**	**540 K**	**7,300 J**
Dieldrin	10.5	--	NA	NA	**140 J**	**6.8 J**	4.5 U
Endosulfan II	6.32	--	NA	NA	**90 J**	**5.5 J**	**80 J**
Endosulfan sulfate	6.32	--	NA	NA	**540 J**	**29 J**	4.5 U
Endrin ketone	1.95	--	NA	NA	**620 J**	3.8 UJ	4.5 U
gamma-Chlordane	11.0	--	NA	NA	**78 J**	**3.2 J**	**52 J**
Dioxin/Furans (PG/G)							
No Detections	--	--	NA	NA	NA	NA	NA
Inorganics (MG/KG)							
Aluminum	pH < 5.5	12,200	NA	NA	**10,100**	**21,500**	**26,000**
Arsenic	18.0	6.36	NA	NA	**3.1 L**	**6.2 L**	**6.5 L**
Barium	330	52.9	NA	NA	**44.8**	**60.7**	**59.1**
Beryllium	40.0	0.587	NA	NA	**0.61**	**0.57**	**0.83**
Cadmium	32.0	1.50	NA	NA	**0.74**	**0.24**	**0.38**
Chromium	64.0	18.2	NA	NA	**16.8 L**	**31.7 L**	**37.5 L**
Cobalt	13.0	9.93	NA	NA	**3**	**3.6 J**	**4**
Copper	70.0	4.25	NA	NA	**55.1 J**	**9.9 J**	**16.3 J**
Iron	5 < pH > 8	19,900	NA	NA	**10,500**	**21,700**	**25,200**
Lead	120	17.4	NA	NA	**64.8**	**40.3**	**33.9**
Manganese	220	324	NA	NA	**135**	**35.8**	**42.1**
Mercury	0.10	0.111	NA	NA	**0.26**	**0.07**	**0.18**
Nickel	38.0	9.52	NA	NA	**9**	**9.1**	**10.4**
Selenium	0.52	0.51	NA	NA	0.9 U	1.5 U	**0.65 J**
Vanadium	130	27.9	NA	NA	**24.6**	**44.3**	**48.2**

Table B-39
Exceedances - Site 9 Surface Soil - Ditch
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	**Soil Screening Value**	**95% UTL**	CAS009-9S12	CAS009-9S13	CAS09-SD01	CAS09-SD02	CAS09-SD03
Sample ID			CAS009-9S12-00-1286	CAS009-9S13-00-1286	CAS09-SD01-1209A	CAS09-SD02-1209A	CAS09-SD03-1209A
Sample Date			12/25/86	12/25/86	12/09/09	12/09/09	12/09/09
Zinc	120	26.5	NA	NA	**104**	**46.2**	**53.8**
Other Parameters							
pH	--	--	NA	NA	**6.1**	**6.1**	**6.3**
Total organic carbon (TOC) (MG/KG)	--	--	NA	NA	**25,000**	**8,100**	**13,000**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

Table B-40
Ecological Screening Statistics - Site 9 "Subsurface Soil" - Ditch
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Volatile Organic Compounds (UG/KG)																			
Tetrachloroethene	6.00 - 6.00	1 / 3	4.00	4.00	CAS09-SD02-1209B	3.33	0.58	4.31	3.30	179	0 / 3	0.02	--	-- / --	--	NO	--	--	NO
Semivolatile Organic Compounds (UG/KG)																			
Acenaphthylene	22.0 - 26.0	1 / 3	1.80	1.80	CAS09-SD02-1209B	8.60	5.97	18.7	6.36	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(a)pyrene	26.0 - 26.0	2 / 3	9.10	11.0	CAS09-SD01-1209B	11.0	1.95	14.3	10.9	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Benzo(k)fluoranthene	26.0 - 26.0	2 / 3	5.70	6.50	CAS09-SD01-1209B	8.40	4.00	15.1	7.84	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Chrysene	26.0 - 26.0	2 / 3	3.80	7.10	CAS09-SD01-1209B	7.97	4.66	15.8	7.05	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Fluoranthene	-- - --	3 / 3	4.10	28.0	CAS09-SD01-1209B	17.0	12.1	37.4	13.0	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Indeno(1,2,3-cd)pyrene	26.0 - 26.0	2 / 3	11.0	11.0	CAS09-SD01-1209B	11.7	1.15	13.6	11.6	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
PAH (HMW)	-- - --	3 / 3	87.1	98.5	CAS09-SD03-1209B	93.9	6.01	104	93.8	18,000	0 / 3	0.01	--	-- / --	--	NO	--	--	NO
PAH (LMW)	-- - --	3 / 3	104	117	CAS09-SD01-1209B	110	6.73	121	109	29,000	0 / 3	0.004	--	-- / --	--	NO	--	--	NO
Phenanthrene	26.0 - 26.0	2 / 3	11.0	12.0	CAS09-SD01-1209B	12.0	1.00	13.7	12.0	LPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pyrene	-- - --	3 / 3	3.30	18.0	CAS09-SD01-1209B	11.8	7.60	24.6	9.40	HPAH	-- / --	--	--	-- / --	--	NO	--	--	NO
Pesticide/Polychlorinated Biphenyls (UG/KG)																			
4,4'-DDD	4.00 - 4.10	1 / 3	46.0	46.0	CAS09-SD01-1209B	16.7	25.4	59.5	5.73	583	0 / 3	0.08	--	-- / --	--	NO	--	--	NO
4,4'-DDE	2.90 - 2.90	2 / 3	5.10	5.30	CAS09-SD02-1209B	3.95	2.17	7.60	3.40	114	0 / 3	0.05	--	-- / --	--	NO	--	--	NO
4,4'-DDT	-- - --	3 / 3	49.0	110	CAS09-SD02-1209B	75.7	31.2	128	71.6	100	1 / 3	1.10	--	-- / --	--	**YES**	1.28	0.76	NO
alpha-Chlordane	2.10 - 2.10	2 / 3	0.48	0.62	CAS09-SD02-1209B	0.72	0.30	1.22	0.68	11.0	0 / 3	0.06	--	-- / --	--	NO	--	--	NO
Aroclor-1260	-- - --	3 / 3	620	1,700	CAS09-SD02-1209B	1,087	555	2,022	997	8,000	0 / 3	0.21	--	-- / --	--	NO	--	--	NO
Dieldrin	4.00 - 4.10	1 / 3	7.70	7.70	CAS09-SD01-1209B	3.92	3.28	9.44	3.16	10.5	0 / 3	0.73	--	-- / --	--	NO	--	--	NO
Endosulfan II	-- - --	3 / 3	5.70	17.0	CAS09-SD02-1209B	10.9	5.70	20.5	9.90	6.32	2 / 3	2.69	--	-- / --	--	**YES**	3.25	1.72	**YES**
Endosulfan sulfate	4.00 - 4.10	1 / 3	34.0	34.0	CAS09-SD01-1209B	12.7	18.5	43.8	5.19	6.32	1 / 3	5.38	--	-- / --	--	**YES**	6.93	2.01	**YES**
gamma-Chlordane	-- - --	3 / 3	4.60	11.0	CAS09-SD02-1209B	7.17	3.38	12.9	6.68	11.0	1 / 3	1.00	--	-- / --	--	**YES**	1.17	0.65	NO
Inorganics (MG/KG)																			
Aluminum	-- - --	3 / 3	8,340	33,500	CAS09-SD02-1209B	24,913	14,356	49,116	20,948	pH < 5.5	0 / 3	--	--	-- / --	--	NO	--	--	NO
Arsenic	-- - --	3 / 3	2.10	10.3	CAS09-SD03-1209B	7.07	4.37	14.4	5.75	18.0	0 / 3	0.57	--	-- / --	--	NO	--	--	NO
Barium	-- - --	3 / 3	34.4	76.6	CAS09-SD03-1209B	62.1	24.0	103	58.4	330	0 / 3	0.23	--	-- / --	--	NO	--	--	NO
Beryllium	-- - --	3 / 3	0.40	0.99	CAS09-SD02-1209B	0.79	0.34	1.36	0.73	40.0	0 / 3	0.02	--	-- / --	--	NO	--	--	NO
Cadmium	-- - --	3 / 3	0.040	0.25	CAS09-SD01-1209B	0.13	0.11	0.31	0.10	32.0	0 / 3	0.01	--	-- / --	--	NO	--	--	NO
Calcium [2]	-- - --	3 / 3	720	2,900	CAS09-SD02-1209B	2,157	1,244	4,255	1,812	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Chromium	-- - --	3 / 3	11.5	46.3	CAS09-SD03-1209B	34.5	19.9	68.2	29.0	64.0	0 / 3	0.72	--	-- / --	--	NO	--	--	NO
Cobalt	-- - --	3 / 3	1.90	5.10	CAS09-SD03-1209B	4.00	1.82	7.07	3.65	13.0	0 / 3	0.39	--	-- / --	--	NO	--	--	NO
Copper	-- - --	3 / 3	4.70	7.10	CAS09-SD01-1209B	5.77	1.22	7.83	5.68	70.0	0 / 3	0.10	--	-- / --	--	NO	--	--	NO
Iron	-- - --	3 / 3	8,270	31,800	CAS09-SD03-1209B	23,557	13,252	45,898	20,039	5 < pH > 8	0 / 3	--	--	-- / --	--	NO	--	--	NO
Lead	-- - --	3 / 3	11.7	15.0	CAS09-SD01-1209B	13.2	1.66	16.0	13.2	120	0 / 3	0.13	--	-- / --	--	NO	--	--	NO
Magnesium [2]	-- - --	3 / 3	617	2,320	CAS09-SD02-1209B	1,732	966	3,361	1,479	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Manganese	-- - --	3 / 3	30.7	88.4	CAS09-SD01-1209B	50.0	33.3	106	43.7	220	0 / 3	0.40	--	-- / --	--	NO	--	--	NO
Mercury	-- - --	3 / 3	0.040	0.15	CAS09-SD01-1209B	0.083	0.059	0.18	0.071	0.10	1 / 3	1.50	0.14	1 / 3	1.07	**YES**	1.82	0.83	NO
Nickel	-- - --	3 / 3	4.20	13.4	CAS09-SD02-1209B	10.3	5.31	19.3	9.10	38.0	0 / 3	0.35	--	-- / --	--	NO	--	--	NO
Potassium [2]	-- - --	3 / 3	478	1,300	CAS09-SD02-1209B	996	451	1,756	909	NSV	-- / --	--	--	-- / --	--	NO	--	--	NO
Selenium	2.40 - 2.40	2 / 3	0.21	0.53	CAS09-SD02-1209B	0.65	0.51	1.50	0.51	0.52	1 / 3	1.02	0.64	0 / 3	0.83	NO	--	--	NO
Thallium	1.30 - 3.50	1 / 3	0.35	0.35	CAS09-SD02-1209B	0.92	0.74	2.16	0.74	1.00	0 / 3	0.35	--	-- / --	--	NO	--	--	NO
Vanadium	-- - --	3 / 3	15.0	61.2	CAS09-SD02-1209B	45.4	26.4	89.9	38.1	130	0 / 3	0.47	--	-- / --	--	NO	--	--	NO

Table B-40
Ecological Screening Statistics - Site 9 "Subsurface Soil" - Ditch
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Chemical	Range of Non-Detect Values	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Arithmetic Mean	Standard Deviation of Mean	95% UCL (Norm)	Geometric Mean	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	95% UTL	Frequency of UTL Exceedance	Maximum Ratio to UTL	Initial COPC?	95% UCL Hazard Quotient	Mean Hazard Quotient	Refined COPC?
Zinc	-- - --	3 / 3	25.3	31.5	CAS09-SD01-1209B	27.9	3.20	33.3	27.8	120	0 / 3	0.26	--	-- / --	--	NO	--	--	NO
Other Parameters																			
pH	-- - --	3 / 3	6.00	6.20	CAS09-SD01-1209B	6.07	0.12	6.26	6.07	--	-- / --	--	--	-- / --	--	--	--	--	--
Total organic carbon (TOC) (MG/KG)	-- - --	3 / 3	3,100	4,200	CAS09-SD03-1209B	3,667	551	4,595	3,639	--	-- / --	--	--	-- / --	--	--	--	--	--

NSV - No Screening Value
1 - Count of detected samples exceeding or equaling Screening Value
2 - Macronutrient - Not considered to be a COPC

Table B-41
Exceedances - Site 9 "Subsurface Soil" - Ditch
Sites 4, 9, and AOC 3 Site Investigation Report
Cheatham Annex, Williamsburg, Virginia

Station ID	Soil Screening Value	95% UTL	CAS09-SD01	CAS09-SD02	CAS09-SD03
Sample ID			CAS09-SD01-1209B	CAS09-SD02-1209B	CAS09-SD03-1209B
Sample Date			12/09/09	12/09/09	12/09/09
Volatile Organic Compounds (UG/KG)					
Tetrachloroethene	179	--	6 U	**4 J**	6 U
Semivolatile Organic Compounds (UG/KG)					
Acenaphthylene	LMW PAH	--	22 U	**1.8 J**	26 U
Benzo(a)pyrene	HMW PAH	--	**11 J**	**9.1 J**	26 U
Benzo(k)fluoranthene	HMW PAH	--	**6.5 J**	**5.7 J**	26 U
Chrysene	HMW PAH	--	**7.1 J**	**3.8 J**	26 U
Fluoranthene	LMW PAH	--	**28**	**19 J**	**4.1 J**
Indeno(1,2,3-cd)pyrene	HMW PAH	--	**11 J**	**11 J**	26 U
PAH (HMW)	18,000	--	**96.1**	**87.1**	**98.5**
PAH (LMW)	29,000	--	**117**	**104**	**108**
Phenanthrene	LMW PAH	--	**12 J**	**11 J**	26 U
Pyrene	HMW PAH	--	**18 J**	**14 J**	**3.3 J**
Pesticide/Polychlorinated Biphenyls (UG/KG)					
4,4'-DDD	583	--	**46 J**	4 UJ	4.1 U
4,4'-DDE	114	--	**5.1 J**	**5.3 J**	2.9 B
4,4'-DDT	100	--	**49 J**	**110 J**	**68**
alpha-Chlordane	11.0	--	**0.48 J**	**0.62 J**	2.1 U
Aroclor-1260	8,000	--	**620**	**1,700 J**	**940 J**
Dieldrin	10.5	--	**7.7 J**	4 UJ	4.1 U
Endosulfan II	6.32	--	**5.7 J**	**17 J**	**10 J**
Endosulfan sulfate	6.32	--	**34 J**	4 UJ	4.1 U
gamma-Chlordane	11.0	--	**4.6 J**	**11 J**	**5.9 J**
Inorganics (MG/KG)					
Aluminum	pH < 5.5	13,000	**8,340**	**33,500**	**32,900**
Arsenic	18.0	5.54	**2.1 L**	**8.8 L**	**10.3 L**
Barium	330	84.5	**34.4**	**75.4**	**76.6**
Beryllium	40.0	0.52	**0.4 J**	**0.99**	**0.98**
Cadmium	32.0	--	**0.25**	**0.04 J**	**0.11 J**
Chromium	64.0	33.7	**11.5 L**	**45.8 L**	**46.3 L**
Cobalt	13.0	5.18	**1.9 J**	**5 J**	**5.1 J**
Copper	70.0	3.17	**7.1 J**	**4.7 J**	**5.5 J**
Iron	5 < pH > 8	32,000	**8,270**	**30,600**	**31,800**
Lead	120	8.79	**15**	**11.7**	**13**
Manganese	220	176	**88.4**	**30.7**	**30.8**
Mercury	0.10	0.14	**0.15**	**0.04**	**0.06**
Nickel	38.0	17.6	**4.2**	**13.4**	**13.4**
Selenium	0.52	0.64	**0.21 J**	**0.53 J**	2.4 U
Thallium	1.00	--	1.3 U	**0.35 J**	3.5 U
Vanadium	130	48.3	**15**	**61.2**	**60.1**
Zinc	120	28.0	**31.5**	**25.3**	**27**
Other Parameters					
pH	--	--	**6.2**	**6.0**	**6.0**
Total organic carbon (TOC) (MG/KG)	--	--	**3,100**	**3,700**	**4,200**

Notes:
Grey highlighting indicates value greater than screening value
Yellow highlighting indicates value equal to screening value
Bold indicates detections
NA - Not analyzed
Equals or Exceeds Background UTL

TABLE B-1-1
Summary of Meadow Vole Exposure Doses - Screening (Step 2)
Site 4

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	6.40E+00	5.23E-01	3.35E+00	1.10E+00	7.06E+00	5.80E-02	7.46E-01	2.52E-01	5.63E-01	1.26E+00	**2.96E+00**	**1.32E+00**	5.92E-01	1.60E-02	1.02E-01
Cadmium	3.30E+00	4.07E+01	1.34E+02	3.25E+00	1.07E+01	8.20E-04	1.35E+00	1.00E+00	3.16E+00	1.00E+01	**1.35E+00**	4.25E-01	1.35E-01	4.48E-01	1.48E+00
Chromium	4.52E+01	3.16E+00	1.43E+02	8.39E-02	3.79E+00	6.30E-03	7.85E-01	3.28E+00	7.33E+00	1.64E+01	2.39E-01	1.07E-01	4.79E-02	3.09E-01	1.40E+01
Copper	1.50E+02	1.53E+00	2.30E+02	6.25E-01	9.38E+01	2.59E-02	1.01E+01	7.80E+01	9.01E+01	1.04E+02	1.30E-01	1.12E-01	9.73E-02	1.29E+00	1.94E+02
Lead	1.29E+02	1.52E+00	1.96E+02	4.68E-01	6.04E+01	5.90E-03	6.69E+00	8.00E+00	2.53E+01	8.00E+01	8.36E-01	2.65E-01	8.36E-02	1.87E-01	2.41E+01
Mercury	8.80E-01	2.06E+01	1.82E+01	5.00E+00	4.40E+00	2.00E-04	4.74E-01	3.20E-02	7.16E-02	1.60E-01	**1.48E+01**	**6.63E+00**	**2.97E+00**	1.92E-01	1.69E-01
Nickel	1.21E+01	4.73E+00	5.72E+01	1.41E+00	1.71E+01	3.50E-03	1.84E+00	4.00E+01	5.66E+01	8.00E+01	4.59E-02	3.25E-02	2.30E-02	8.98E-01	1.09E+01
Selenium	1.00E+00	1.34E+00	1.34E+00	3.01E+00	3.01E+00	1.30E-03	3.03E-01	2.00E-01	2.57E-01	3.30E-01	**1.52E+00**	**1.18E+00**	9.19E-01	1.19E+00	1.19E+00
Zinc	3.24E+02	1.29E+01	4.17E+03	1.82E+00	5.90E+02	6.54E-02	6.77E+01	1.60E+02	2.26E+02	3.20E+02	4.23E-01	2.99E-01	2.12E-01	2.32E+00	7.51E+02
Polychlorinated Biphenyls															
Aroclor-1242	1.00E+00	1.59E+01	1.59E+01	3.23E-01	3.23E-01	8.00E-04	6.76E-02	1.36E-01	3.04E-01	6.80E-01	4.97E-01	2.22E-01	9.94E-02	See footnote	6.51E-01
Aroclor-1260	2.70E+00	1.59E+01	4.30E+01	1.05E-01	2.84E-01	8.00E-04	1.24E-01	1.36E-01	3.04E-01	6.80E-01	9.11E-01	4.07E-01	1.82E-01	See footnote	1.20E+00
Pesticides															
4,4'-DDE	4.30E-02	1.12E+01	4.82E-01	1.09E-01	4.70E-03	1.30E-04	1.62E-03	8.00E-01	1.79E+00	4.00E+00	2.03E-03	9.08E-04	4.06E-04	See footnote	1.52E-02
4,4'-DDT	2.20E-01	1.12E+01	2.46E+00	1.35E-01	2.98E-02	1.30E-04	8.64E-03	8.00E-01	1.79E+00	4.00E+00	1.08E-02	4.83E-03	2.16E-03	See footnote	8.30E-02
Aldrin	3.30E-02	3.30E+00	1.09E-01	1.39E-01	4.60E-03	6.70E-05	7.91E-04	2.00E-01	4.47E-01	1.00E+00	3.95E-03	1.77E-03	7.91E-04	See footnote	7.36E-03
alpha-Chlordane	5.40E-04	4.00E+00	2.16E-03	1.65E-01	8.90E-05	6.70E-05	4.44E-05	4.58E+00	6.48E+00	9.16E+00	9.69E-06	6.85E-06	4.84E-06	See footnote	1.41E-04
Endosulfan II	5.70E-03	1.00E+00	5.70E-03	8.86E-01	5.05E-03	1.30E-04	5.82E-04	1.50E-01	3.35E-01	7.50E-01	3.88E-03	1.74E-03	7.76E-04	See footnote	5.08E-03
Endrin	2.80E-02	3.60E+00	1.01E-01	5.35E-01	1.50E-02	1.30E-04	1.81E-03	1.84E-01	4.11E-01	9.20E-01	9.86E-03	4.41E-03	1.97E-03	See footnote	1.70E-02
gamma-Chlordane	1.50E-02	4.00E+00	6.00E-02	1.65E-01	2.47E-03	6.70E-05	4.35E-04	4.58E+00	6.48E+00	9.16E+00	9.50E-05	6.72E-05	4.75E-05	See footnote	3.92E-03
Semivolatile Organics															
Acenaphthene	3.30E-01	3.00E-01	9.90E-02	1.55E+00	5.12E-01	6.90E-05	5.16E-02	3.50E+02	4.95E+02	7.00E+02	1.47E-04	1.04E-04	7.37E-05	0.00E+00	0.00E+00
Anthracene	5.30E-01	3.20E-01	1.70E-01	8.61E-01	4.56E-01	2.00E-04	4.68E-02	1.00E+03	2.24E+03	5.00E+03	4.68E-05	2.09E-05	9.37E-06	0.00E+00	0.00E+00
Benzo(a)anthracene	1.10E+00	2.70E-01	2.97E-01	2.94E-01	3.24E-01	3.40E-04	3.55E-02	2.00E+00	4.47E+00	1.00E+01	1.77E-02	7.93E-03	3.55E-03	0.00E+00	0.00E+00
Benzo(a)pyrene	2.30E+00	3.40E-01	7.82E-01	2.01E-01	4.61E-01	2.40E-04	5.30E-02	2.00E+00	4.47E+00	1.00E+01	2.65E-02	1.18E-02	5.30E-03	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.70E+00	2.10E-01	3.57E-01	3.10E-01	5.27E-01	5.80E-04	5.73E-02	2.00E+00	4.47E+00	1.00E+01	2.86E-02	1.28E-02	5.73E-03	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.20E+00	1.50E-01	1.80E-01	1.16E-01	1.39E-01	1.60E-04	1.71E-02	2.00E+00	4.47E+00	1.00E+01	8.56E-03	3.83E-03	1.71E-03	0.00E+00	0.00E+00
Benzo(k)fluoranthene	1.70E+00	2.10E-01	3.57E-01	1.84E-01	3.13E-01	1.50E-04	3.60E-02	2.00E+00	4.47E+00	1.00E+01	1.80E-02	8.05E-03	3.60E-03	0.00E+00	0.00E+00
Chrysene	2.20E+00	4.40E-01	9.68E-01	2.94E-01	6.47E-01	8.00E-05	7.14E-02	2.00E+00	4.47E+00	1.00E+01	3.57E-02	1.60E-02	7.14E-03	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	1.30E-02	4.90E-01	6.37E-03	1.30E-01	1.69E-03	2.00E-04	3.01E-04	2.00E+00	4.47E+00	1.00E+01	1.51E-04	6.74E-05	3.01E-05	0.00E+00	0.00E+00
Fluoranthene	2.70E+00	3.70E-01	9.99E-01	5.00E-01	1.35E+00	3.20E-04	1.42E-01	5.00E+02	1.12E+03	2.50E+03	2.85E-04	1.27E-04	5.69E-05	0.00E+00	0.00E+00
Fluorene	2.50E-01	2.00E-01	5.00E-02	1.18E+00	2.96E-01	2.00E-04	3.00E-02	5.00E+02	1.12E+03	2.50E+03	6.01E-05	2.69E-05	1.20E-05	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	1.30E+00	4.10E-01	5.33E-01	1.10E-01	1.43E-01	2.40E-04	1.86E-02	2.00E+00	4.47E+00	1.00E+01	9.28E-03	4.15E-03	1.86E-03	0.00E+00	0.00E+00
Phenanthrene	2.40E+00	2.80E-01	6.72E-01	8.61E-01	2.07E+00	8.80E-05	2.12E-01	5.00E+02	1.12E+03	2.50E+03	4.23E-04	1.89E-04	8.46E-05	0.00E+00	0.00E+00
Pyrene	3.00E+00	3.90E-01	1.17E+00	7.20E-01	2.16E+00	2.90E-04	2.23E-01	2.00E+00	4.47E+00	1.00E+01	1.12E-01	4.99E-02	2.23E-02	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0031 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis
PDFi = 0.020 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis
PDFi = 0.956 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.024 = Proportion of diet composed of soil
WIR = 0.0133 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0300 = Body weight (kg)

TABLE B-1-2
Summary of Short-tailed Shrew Exposure Doses - Screening (Step 2)
Site 4

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	6.40E+00	5.23E-01	3.35E+00	1.10E+00	7.06E+00	5.80E-02	5.76E-01	2.52E-01	5.63E-01	1.26E+00	**2.29E+00**	**1.02E+00**	4.57E-01	1.49E-02	9.54E-02
Cadmium	3.30E+00	4.07E+01	1.34E+02	3.25E+00	1.07E+01	8.20E-04	1.58E+01	1.00E+00	3.16E+00	1.00E+01	**1.58E+01**	**4.99E+00**	**1.58E+00**	7.02E+00	2.32E+01
Chromium	4.52E+01	3.16E+00	1.43E+02	8.39E-02	3.79E+00	6.30E-03	1.75E+01	3.28E+00	7.33E+00	1.64E+01	**5.34E+00**	**2.39E+00**	**1.07E+00**	3.33E-01	1.51E+01
Copper	1.50E+02	1.53E+00	2.30E+02	6.25E-01	9.38E+01	2.59E-02	3.02E+01	7.80E+01	9.01E+01	1.04E+02	3.87E-01	3.35E-01	2.90E-01	1.12E+00	1.68E+02
Lead	1.29E+02	1.52E+00	1.96E+02	4.68E-01	6.04E+01	5.90E-03	2.57E+01	8.00E+00	2.53E+01	8.00E+01	**3.21E+00**	**1.01E+00**	3.21E-01	3.39E-01	4.37E+01
Mercury	8.80E-01	2.06E+01	1.82E+01	5.00E+00	4.40E+00	2.00E-04	2.16E+00	3.20E-02	7.16E-02	1.60E-01	**6.76E+01**	**3.02E+01**	**1.35E+01**	1.92E-01	1.69E-01
Nickel	1.21E+01	4.73E+00	5.72E+01	1.41E+00	1.71E+01	3.50E-03	7.01E+00	4.00E+01	5.66E+01	8.00E+01	1.75E-01	1.24E-01	8.76E-02	5.78E-01	6.99E+00
Selenium	1.00E+00	1.34E+00	1.34E+00	3.01E+00	3.01E+00	1.30E-03	1.95E-01	2.00E-01	2.57E-01	3.30E-01	9.76E-01	7.60E-01	5.92E-01	1.19E+00	1.19E+00
Zinc	3.24E+02	1.29E+01	4.17E+03	1.82E+00	5.90E+02	6.54E-02	4.97E+02	1.60E+02	2.26E+02	3.20E+02	**3.10E+00**	**2.20E+00**	**1.55E+00**	2.90E+00	9.40E+02
Polychlorinated Biphenyls															
Aroclor-1242	1.00E+00	1.59E+01	1.59E+01	3.23E-01	3.23E-01	8.00E-04	1.88E+00	1.36E-01	3.04E-01	6.80E-01	**1.38E+01**	**6.17E+00**	**2.76E+00**	See footnote	1.32E+01
Aroclor-1260	2.70E+00	1.59E+01	4.30E+01	1.05E-01	2.84E-01	8.00E-04	5.06E+00	1.36E-01	3.04E-01	6.80E-01	**3.72E+01**	**1.66E+01**	**7.44E+00**	See footnote	3.57E+01
Pesticides															
4,4'-DDE	4.30E-02	1.12E+01	4.82E-01	1.09E-01	4.70E-03	1.30E-04	5.70E-02	8.00E-01	1.79E+00	4.00E+00	7.13E-02	3.19E-02	1.43E-02	See footnote	4.02E-01
4,4'-DDT	2.20E-01	1.12E+01	2.46E+00	1.35E-01	2.98E-02	1.30E-04	2.92E-01	8.00E-01	1.79E+00	4.00E+00	3.65E-01	1.63E-01	7.29E-02	See footnote	2.06E+00
Aldrin	3.30E-02	3.30E+00	1.09E-01	1.39E-01	4.60E-03	6.70E-05	1.34E-02	2.00E-01	4.47E-01	1.00E+00	6.68E-02	2.99E-02	1.34E-02	See footnote	9.41E-02
alpha-Chlordane	5.40E-04	4.00E+00	2.16E-03	1.65E-01	8.90E-05	6.70E-05	2.86E-04	4.58E+00	6.48E+00	9.16E+00	6.25E-05	4.42E-05	3.13E-05	See footnote	1.85E-03
Endosulfan II	5.70E-03	1.00E+00	5.70E-03	8.86E-01	5.05E-03	1.30E-04	8.50E-04	1.50E-01	3.35E-01	7.50E-01	5.66E-03	2.53E-03	1.13E-03	See footnote	5.67E-03
Endrin	2.80E-02	3.60E+00	1.01E-01	5.35E-01	1.50E-02	1.30E-04	1.24E-02	1.84E-01	4.11E-01	9.20E-01	6.75E-02	3.02E-02	1.35E-02	See footnote	8.73E-02
gamma-Chlordane	1.50E-02	4.00E+00	6.00E-02	1.65E-01	2.47E-03	6.70E-05	7.31E-03	4.58E+00	6.48E+00	9.16E+00	1.60E-03	1.13E-03	7.98E-04	See footnote	5.14E-02
Semivolatile Organics															
Acenaphthene	3.30E-01	3.00E-01	9.90E-02	1.55E+00	5.12E-01	6.90E-05	2.11E-02	3.50E+02	4.95E+02	7.00E+02	6.02E-05	4.25E-05	3.01E-05	0.00E+00	0.00E+00
Anthracene	5.30E-01	3.20E-01	1.70E-01	8.61E-01	4.56E-01	2.00E-04	3.27E-02	1.00E+03	2.24E+03	5.00E+03	3.27E-05	1.46E-05	6.53E-06	0.00E+00	0.00E+00
Benzo(a)anthracene	1.10E+00	2.70E-01	2.97E-01	2.94E-01	3.24E-01	3.40E-04	5.72E-02	2.00E+00	4.47E+00	1.00E+01	2.86E-02	1.28E-02	5.72E-03	0.00E+00	0.00E+00
Benzo(a)pyrene	2.30E+00	3.40E-01	7.82E-01	2.01E-01	4.61E-01	2.40E-04	1.37E-01	2.00E+00	4.47E+00	1.00E+01	6.84E-02	3.06E-02	1.37E-02	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.70E+00	2.10E-01	3.57E-01	3.10E-01	5.27E-01	5.80E-04	7.67E-02	2.00E+00	4.47E+00	1.00E+01	3.83E-02	1.71E-02	7.67E-03	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.20E+00	1.50E-01	1.80E-01	1.16E-01	1.39E-01	1.60E-04	4.41E-02	2.00E+00	4.47E+00	1.00E+01	2.20E-02	9.86E-03	4.41E-03	0.00E+00	0.00E+00
Benzo(k)fluoranthene	1.70E+00	2.10E-01	3.57E-01	1.84E-01	3.13E-01	1.50E-04	7.51E-02	2.00E+00	4.47E+00	1.00E+01	3.75E-02	1.68E-02	7.51E-03	0.00E+00	0.00E+00
Chrysene	2.20E+00	4.40E-01	9.68E-01	2.94E-01	6.47E-01	8.00E-05	1.58E-01	2.00E+00	4.47E+00	1.00E+01	7.89E-02	3.53E-02	1.58E-02	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	1.30E-02	4.90E-01	6.37E-03	1.30E-01	1.69E-03	2.00E-04	1.06E-03	2.00E+00	4.47E+00	1.00E+01	5.32E-04	2.38E-04	1.06E-04	0.00E+00	0.00E+00
Fluoranthene	2.70E+00	3.70E-01	9.99E-01	5.00E-01	1.35E+00	3.20E-04	1.75E-01	5.00E+02	1.12E+03	2.50E+03	3.51E-04	1.57E-04	7.01E-05	0.00E+00	0.00E+00
Fluorene	2.50E-01	2.00E-01	5.00E-02	1.18E+00	2.96E-01	2.00E-04	1.25E-02	5.00E+02	1.12E+03	2.50E+03	2.50E-05	1.12E-05	4.99E-06	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	1.30E+00	4.10E-01	5.33E-01	1.10E-01	1.43E-01	2.40E-04	8.71E-02	2.00E+00	4.47E+00	1.00E+01	4.36E-02	1.95E-02	8.71E-03	0.00E+00	0.00E+00
Phenanthrene	2.40E+00	2.80E-01	6.72E-01	8.61E-01	2.07E+00	8.80E-05	1.36E-01	5.00E+02	1.12E+03	2.50E+03	2.73E-04	1.22E-04	5.45E-05	0.00E+00	0.00E+00
Pyrene	3.00E+00	3.90E-01	1.17E+00	7.20E-01	2.16E+00	2.90E-04	2.06E-01	2.00E+00	4.47E+00	1.00E+01	1.03E-01	4.61E-02	2.06E-02	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0019 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.823 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis
PDFi = 0.047 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.130 = Proportion of diet composed of soil
WIR = 0.0048 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.01331 = Body weight (kg)

TABLE B-1-3

Summary of White-footed Mouse Exposure Doses - Screening (Step 2)

Site 4

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	6.40E+00	5.23E-01	3.35E+00	1.10E+00	7.06E+00	5.80E-02	3.13E-01	2.52E-01	5.63E-01	1.26E+00	**1.24E+00**	5.55E-01	2.48E-01	1.40E-02	8.96E-02
Cadmium	3.30E+00	4.07E+01	1.34E+02	3.25E+00	1.07E+01	8.20E-04	3.56E+00	1.00E+00	3.16E+00	1.00E+01	**3.56E+00**	**1.13E+00**	3.56E-01	4.62E-01	1.52E+00
Chromium	4.52E+01	3.16E+00	1.43E+02	8.39E-02	3.79E+00	6.30E-03	3.64E+00	3.28E+00	7.33E+00	1.64E+01	**1.11E+00**	4.96E-01	2.22E-01	3.49E-01	1.58E+01
Copper	1.50E+02	1.53E+00	2.30E+02	6.25E-01	9.38E+01	2.59E-02	8.26E+00	7.80E+01	9.01E+01	1.04E+02	1.06E-01	9.17E-02	7.94E-02	5.54E-01	8.31E+01
Lead	1.29E+02	1.52E+00	1.96E+02	4.68E-01	6.04E+01	5.90E-03	6.53E+00	8.00E+00	2.53E+01	8.00E+01	8.16E-01	2.58E-01	8.16E-02	2.86E-01	3.69E+01
Mercury	8.80E-01	2.06E+01	1.82E+01	5.00E+00	4.40E+00	2.00E-04	5.60E-01	3.20E-02	7.16E-02	1.60E-01	**1.75E+01**	**7.83E+00**	**3.50E+00**	1.30E-01	1.14E-01
Nickel	1.21E+01	4.73E+00	5.72E+01	1.41E+00	1.71E+01	3.50E-03	1.86E+00	4.00E+01	5.66E+01	8.00E+01	4.66E-02	3.29E-02	2.33E-02	5.89E-01	7.13E+00
Selenium	1.00E+00	1.34E+00	1.34E+00	3.01E+00	3.01E+00	1.30E-03	1.14E-01	2.00E-01	2.57E-01	3.30E-01	5.71E-01	4.45E-01	3.46E-01	1.26E+00	1.26E+00
Zinc	3.24E+02	1.29E+01	4.17E+03	1.82E+00	5.90E+02	6.54E-02	1.18E+02	1.60E+02	2.26E+02	3.20E+02	7.36E-01	5.21E-01	3.68E-01	2.78E+00	9.01E+02
Polychlorinated Biphenyls															
Aroclor-1242	1.00E+00	1.59E+01	1.59E+01	3.23E-01	3.23E-01	8.00E-04	3.98E-01	1.36E-01	3.04E-01	6.80E-01	**2.93E+00**	**1.31E+00**	5.86E-01	See footnote	7.66E+00
Aroclor-1260	2.70E+00	1.59E+01	4.30E+01	1.05E-01	2.84E-01	8.00E-04	1.06E+00	1.36E-01	3.04E-01	6.80E-01	**7.78E+00**	**3.48E+00**	**1.56E+00**	See footnote	2.04E+01
Pesticides															
4,4'-DDE	4.30E-02	1.12E+01	4.82E-01	1.09E-01	4.70E-03	1.30E-04	1.20E-02	8.00E-01	1.79E+00	4.00E+00	1.50E-02	6.71E-03	3.00E-03	See footnote	2.30E-01
4,4'-DDT	2.20E-01	1.12E+01	2.46E+00	1.35E-01	2.98E-02	1.30E-04	6.12E-02	8.00E-01	1.79E+00	4.00E+00	7.65E-02	3.42E-02	1.53E-02	See footnote	1.18E+00
Aldrin	3.30E-02	3.30E+00	1.09E-01	1.39E-01	4.60E-03	6.70E-05	2.86E-03	2.00E-01	4.47E-01	1.00E+00	1.43E-02	6.39E-03	2.86E-03	See footnote	5.42E-02
alpha-Chlordane	5.40E-04	4.00E+00	2.16E-03	1.65E-01	8.90E-05	6.70E-05	9.91E-05	4.58E+00	6.48E+00	9.16E+00	2.16E-05	1.53E-05	1.08E-05	See footnote	1.07E-03
Endosulfan II	5.70E-03	1.00E+00	5.70E-03	8.86E-01	5.05E-03	1.30E-04	3.63E-04	1.50E-01	3.35E-01	7.50E-01	2.42E-03	1.08E-03	4.84E-04	See footnote	5.37E-03
Endrin	2.80E-02	3.60E+00	1.01E-01	5.35E-01	1.50E-02	1.30E-04	2.97E-03	1.84E-01	4.11E-01	9.20E-01	1.61E-02	7.22E-03	3.23E-03	See footnote	5.56E-02
gamma-Chlordane	1.50E-02	4.00E+00	6.00E-02	1.65E-01	2.47E-03	6.70E-05	1.59E-03	4.58E+00	6.48E+00	9.16E+00	3.47E-04	2.45E-04	1.73E-04	See footnote	2.98E-02
Semivolatile Organics															
Acenaphthene	3.30E-01	3.00E-01	9.90E-02	1.55E+00	5.12E-01	6.90E-05	1.64E-02	3.50E+02	4.95E+02	7.00E+02	4.67E-05	3.30E-05	2.34E-05	0.00E+00	0.00E+00
Anthracene	5.30E-01	3.20E-01	1.70E-01	8.61E-01	4.56E-01	2.00E-04	1.69E-02	1.00E+03	2.24E+03	5.00E+03	1.69E-05	7.56E-06	3.38E-06	0.00E+00	0.00E+00
Benzo(a)anthracene	1.10E+00	2.70E-01	2.97E-01	2.94E-01	3.24E-01	3.40E-04	1.72E-02	2.00E+00	4.47E+00	1.00E+01	8.59E-03	3.84E-03	1.72E-03	0.00E+00	0.00E+00
Benzo(a)pyrene	2.30E+00	3.40E-01	7.82E-01	2.01E-01	4.61E-01	2.40E-04	3.38E-02	2.00E+00	4.47E+00	1.00E+01	1.69E-02	7.56E-03	3.38E-03	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.70E+00	2.10E-01	3.57E-01	3.10E-01	5.27E-01	5.80E-04	2.48E-02	2.00E+00	4.47E+00	1.00E+01	1.24E-02	5.55E-03	2.48E-03	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.20E+00	1.50E-01	1.80E-01	1.16E-01	1.39E-01	1.60E-04	9.41E-03	2.00E+00	4.47E+00	1.00E+01	4.71E-03	2.10E-03	9.41E-04	0.00E+00	0.00E+00
Benzo(k)fluoranthene	1.70E+00	2.10E-01	3.57E-01	1.84E-01	3.13E-01	1.50E-04	1.89E-02	2.00E+00	4.47E+00	1.00E+01	9.43E-03	4.22E-03	1.89E-03	0.00E+00	0.00E+00
Chrysene	2.20E+00	4.40E-01	9.68E-01	2.94E-01	6.47E-01	8.00E-05	4.31E-02	2.00E+00	4.47E+00	1.00E+01	2.15E-02	9.63E-03	4.31E-03	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	1.30E-02	4.90E-01	6.37E-03	1.30E-01	1.69E-03	2.00E-04	3.43E-04	2.00E+00	4.47E+00	1.00E+01	1.72E-04	7.68E-05	3.43E-05	0.00E+00	0.00E+00
Fluoranthene	2.70E+00	3.70E-01	9.99E-01	5.00E-01	1.35E+00	3.20E-04	6.31E-02	5.00E+02	1.12E+03	2.50E+03	1.26E-04	5.64E-05	2.52E-05	0.00E+00	0.00E+00
Fluorene	2.50E-01	2.00E-01	5.00E-02	1.18E+00	2.96E-01	2.00E-04	9.44E-03	5.00E+02	1.12E+03	2.50E+03	1.89E-05	8.44E-06	3.78E-06	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	1.30E+00	4.10E-01	5.33E-01	1.10E-01	1.43E-01	2.40E-04	1.83E-02	2.00E+00	4.47E+00	1.00E+01	9.15E-03	4.09E-03	1.83E-03	0.00E+00	0.00E+00
Phenanthrene	2.40E+00	2.80E-01	6.72E-01	8.61E-01	2.07E+00	8.80E-05	7.36E-02	5.00E+02	1.12E+03	2.50E+03	1.47E-04	6.59E-05	2.95E-05	0.00E+00	0.00E+00
Pyrene	3.00E+00	3.90E-01	1.17E+00	7.20E-01	2.16E+00	2.90E-04	8.90E-02	2.00E+00	4.47E+00	1.00E+01	4.45E-02	1.99E-02	8.90E-03	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0007 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.470 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.510 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.020 = Proportion of diet composed of soil
WIR = 0.0092 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0141 = Body weight (kg)

TABLE B-1-4
Summary of Red Fox Exposure Doses - Screening (Step 2)
Site 4

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	6.40E+00	5.23E-01	3.35E+00	1.10E+00	7.06E+00	See footenote	9.58E-02	5.80E-02	4.72E-02	1.20E+00	2.68E+00	6.00E+00	3.93E-02	1.76E-02	7.86E-03
Cadmium	3.30E+00	4.07E+01	1.34E+02	3.25E+00	1.07E+01	See footenote	8.72E+00	8.20E-04	5.69E-01	7.50E-01	1.68E+00	3.75E+00	7.59E-01	3.40E-01	1.52E-01
Chromium	4.52E+01	3.16E+00	1.43E+02	8.39E-02	3.79E+00	See footenote	1.49E+01	6.30E-03	8.66E-01	3.28E+00	7.33E+00	1.64E+01	2.64E-01	1.18E-01	5.28E-02
Copper	1.50E+02	1.53E+00	2.30E+02	6.25E-01	9.38E+01	See footenote	1.48E+02	2.59E-02	6.83E+00	1.17E+01	1.33E+01	1.51E+01	5.84E-01	5.13E-01	4.51E-01
Lead	1.29E+02	1.52E+00	1.96E+02	4.68E-01	6.04E+01	See footenote	3.49E+01	5.90E-03	2.04E+00	8.00E+00	2.53E+01	8.00E+01	2.55E-01	8.08E-02	2.55E-02
Mercury	8.80E-01	2.06E+01	1.82E+01	5.00E+00	4.40E+00	See footenote	1.51E-01	2.00E-04	4.53E-02	1.50E-01	1.94E-01	2.50E-01	3.02E-01	2.34E-01	1.81E-01
Nickel	1.21E+01	4.73E+00	5.72E+01	1.41E+00	1.71E+01	See footenote	8.33E+00	3.50E-03	4.86E-01	2.50E+01	3.95E+01	6.25E+01	1.94E-02	1.23E-02	7.77E-03
Selenium	1.00E+00	1.34E+00	1.34E+00	3.01E+00	3.01E+00	See footenote	1.21E+00	1.30E-03	6.24E-02	2.00E-01	2.57E-01	3.30E-01	3.12E-01	2.43E-01	1.89E-01
Zinc	3.24E+02	1.29E+01	4.17E+03	1.82E+00	5.90E+02	See footenote	8.64E+02	6.54E-02	4.30E+01	2.08E+01	4.65E+01	1.04E+02	**2.07E+00**	9.24E-01	4.13E-01
Polychlorinated Biphenyls															
Aroclor-1242	1.00E+00	1.59E+01	1.59E+01	3.23E-01	3.23E-01	See footenote	7.18E+00	8.00E-04	3.16E-01	1.38E-01	3.09E-01	6.90E-01	**2.29E+00**	**1.02E+00**	4.57E-01
Aroclor-1260	2.70E+00	1.59E+01	4.30E+01	1.05E-01	2.84E-01	See footenote	1.91E+01	8.00E-04	8.38E-01	1.40E-01	3.11E-01	6.90E-01	**5.99E+00**	**2.70E+00**	**1.21E+00**
Pesticides															
4,4'-DDE	4.30E-02	1.12E+01	4.82E-01	1.09E-01	4.70E-03	See footenote	2.16E-01	1.30E-04	9.49E-03	1.00E+00	2.24E+00	5.00E+00	9.49E-03	4.25E-03	1.90E-03
4,4'-DDT	2.20E-01	1.12E+01	2.46E+00	1.35E-01	2.98E-02	See footenote	1.11E+00	1.30E-04	4.86E-02	1.00E+00	2.24E+00	5.00E+00	4.86E-02	2.18E-02	9.73E-03
Aldrin	3.30E-02	3.30E+00	1.09E-01	1.39E-01	4.60E-03	See footenote	5.19E-02	6.70E-05	2.32E-03	2.00E-01	4.47E-01	1.00E+00	1.16E-02	5.19E-03	2.32E-03
alpha-Chlordane	5.40E-04	4.00E+00	2.16E-03	1.65E-01	8.90E-05	See footenote	1.02E-03	6.70E-05	5.41E-05	4.58E+00	6.48E+00	9.16E+00	1.18E-05	8.35E-06	5.91E-06
Endosulfan II	5.70E-03	1.00E+00	5.70E-03	8.86E-01	5.05E-03	See footenote	5.37E-03	1.30E-04	2.67E-04	1.00E+00	2.24E+00	5.00E+00	2.67E-04	1.19E-04	5.34E-05
Endrin	2.80E-02	3.60E+00	1.01E-01	5.35E-01	1.50E-02	See footenote	5.33E-02	1.30E-04	2.40E-03	1.84E-01	4.11E-01	9.20E-01	1.31E-02	5.84E-03	2.61E-03
gamma-Chlordane	1.50E-02	4.00E+00	6.00E-02	1.65E-01	2.47E-03	See footenote	2.84E-02	6.70E-05	1.27E-03	4.58E+00	6.48E+00	9.16E+00	2.77E-04	1.96E-04	1.39E-04
Semivolatile Organics															
Acenaphthene	3.30E-01	3.00E-01	9.90E-02	1.55E+00	5.12E-01	See footenote	0.00E+00	6.90E-05	2.24E-03	3.50E+02	4.95E+02	7.00E+02	6.39E-06	4.52E-06	3.20E-06
Anthracene	5.30E-01	3.20E-01	1.70E-01	8.61E-01	4.56E-01	See footenote	0.00E+00	2.00E-04	2.43E-03	1.00E+03	2.24E+03	5.00E+03	2.43E-06	1.08E-06	4.85E-07
Benzo(a)anthracene	1.10E+00	2.70E-01	2.97E-01	2.94E-01	3.24E-01	See footenote	0.00E+00	3.40E-04	2.92E-03	2.00E+00	4.47E+00	1.00E+01	1.46E-03	6.53E-04	2.92E-04
Benzo(a)pyrene	2.30E+00	3.40E-01	7.82E-01	2.01E-01	4.61E-01	See footenote	0.00E+00	2.40E-04	5.55E-03	2.00E+00	4.47E+00	1.00E+01	2.78E-03	1.24E-03	5.55E-04
Benzo(b)fluoranthene	1.70E+00	2.10E-01	3.57E-01	3.10E-01	5.27E-01	See footenote	0.00E+00	5.80E-04	4.48E-03	2.00E+00	4.47E+00	1.00E+01	2.24E-03	1.00E-03	4.48E-04
Benzo(g,h,i)perylene	1.20E+00	1.50E-01	1.80E-01	1.16E-01	1.39E-01	See footenote	0.00E+00	1.60E-04	2.27E-03	2.00E+00	4.47E+00	1.00E+01	1.14E-03	5.08E-04	2.27E-04
Benzo(k)fluoranthene	1.70E+00	2.10E-01	3.57E-01	1.84E-01	3.13E-01	See footenote	0.00E+00	1.50E-04	3.72E-03	2.00E+00	4.47E+00	1.00E+01	1.86E-03	8.33E-04	3.72E-04
Chrysene	2.20E+00	4.40E-01	9.68E-01	2.94E-01	6.47E-01	See footenote	0.00E+00	8.00E-05	6.25E-03	2.00E+00	4.47E+00	1.00E+01	3.13E-03	1.40E-03	6.25E-04
Dibenz(a,h)anthracene	1.30E-02	4.90E-01	6.37E-03	1.30E-01	1.69E-03	See footenote	0.00E+00	2.00E-04	5.67E-05	2.00E+00	4.47E+00	1.00E+01	2.84E-05	1.27E-05	5.67E-06
Fluoranthene	2.70E+00	3.70E-01	9.99E-01	5.00E-01	1.35E+00	See footenote	0.00E+00	3.20E-04	9.27E-03	5.00E+02	1.12E+03	2.50E+03	1.85E-05	8.29E-06	3.71E-06
Fluorene	2.50E-01	2.00E-01	5.00E-02	1.18E+00	2.96E-01	See footenote	0.00E+00	2.00E-04	1.38E-03	5.00E+02	1.12E+03	2.50E+03	2.76E-06	1.24E-06	5.53E-07
Indeno(1,2,3-cd)pyrene	1.30E+00	4.10E-01	5.33E-01	1.10E-01	1.43E-01	See footenote	0.00E+00	2.40E-04	2.89E-03	2.00E+00	4.47E+00	1.00E+01	1.44E-03	6.46E-04	2.89E-04
Phenanthrene	2.40E+00	2.80E-01	6.72E-01	8.61E-01	2.07E+00	See footenote	0.00E+00	8.80E-05	1.08E-02	5.00E+02	1.12E+03	2.50E+03	2.15E-05	9.62E-06	4.30E-06
Pyrene	3.00E+00	3.90E-01	1.17E+00	7.20E-01	2.16E+00	See footenote	0.00E+00	2.90E-04	1.25E-02	2.00E+00	4.47E+00	1.00E+01	6.26E-03	2.80E-03	1.25E-03

Assumes equal proportions of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1476 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.028 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 0.874 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.028 = Proportion of diet composed of soil
WIR = 0.4115 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 3.17 = Body weight (kg)

TABLE B-1-5
Summary of American Robin Exposure Doses - Screening (Step 2)
Site 4

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Arsenic	6.40E+00	5.23E-01	3.35E+00	1.10E+00	7.06E+00	5.80E-02	6.39E-01	2.46E+00	4.26E+00	7.38E+00	2.60E-01	1.50E-01	8.66E-02
Cadmium	3.30E+00	4.07E+01	1.34E+02	3.25E+00	1.07E+01	8.20E-04	7.43E+00	1.45E+00	5.39E+00	2.00E+01	**5.13E+00**	**1.38E+00**	3.72E-01
Chromium	4.52E+01	3.16E+00	1.43E+02	8.39E-02	3.79E+00	6.30E-03	7.68E+00	1.00E+00	2.24E+00	5.00E+00	**7.68E+00**	**3.43E+00**	**1.54E+00**
Copper	1.50E+02	1.53E+00	2.30E+02	6.25E-01	9.38E+01	2.59E-02	1.80E+01	4.70E+01	5.39E+01	6.17E+01	3.83E-01	3.35E-01	2.92E-01
Lead	1.29E+02	1.52E+00	1.96E+02	4.68E-01	6.04E+01	5.90E-03	1.42E+01	3.85E+00	8.61E+00	1.93E+01	**3.69E+00**	**1.65E+00**	7.39E-01
Mercury	8.80E-01	2.06E+01	1.82E+01	5.00E+00	4.40E+00	2.00E-04	1.18E+00	4.90E-01	7.67E-01	1.20E+00	**2.42E+00**	**1.54E+00**	9.87E-01
Nickel	1.21E+01	4.73E+00	5.72E+01	1.41E+00	1.71E+01	3.50E-03	3.98E+00	7.74E+01	9.10E+01	1.07E+02	5.14E-02	4.37E-02	3.72E-02
Selenium	1.00E+00	1.34E+00	1.34E+00	3.01E+00	3.01E+00	1.30E-03	2.54E-01	4.40E-01	6.80E-01	1.05E+00	5.78E-01	3.74E-01	2.42E-01
Zinc	3.24E+02	1.29E+01	4.17E+03	1.82E+00	5.90E+02	6.54E-02	2.48E+02	1.45E+01	4.36E+01	1.31E+02	**1.71E+01**	**5.68E+00**	**1.89E+00**
Polychlorinated Biphenyls													
Aroclor-1242	1.00E+00	1.59E+01	1.59E+01	3.23E-01	3.23E-01	8.00E-04	8.27E-01	4.10E-01	9.17E-01	2.05E+00	**2.02E+00**	9.02E-01	4.03E-01
Aroclor-1260	2.70E+00	1.59E+01	4.30E+01	1.05E-01	2.84E-01	8.00E-04	2.20E+00	4.10E-01	9.17E-01	2.05E+00	**5.36E+00**	**2.40E+00**	**1.07E+00**
Pesticides													
4,4'-DDE	4.30E-02	1.12E+01	4.82E-01	1.09E-01	4.70E-03	1.30E-04	2.48E-02	5.00E-01	1.58E+00	5.00E+00	4.96E-02	1.57E-02	4.96E-03
4,4'-DDT	2.20E-01	1.12E+01	2.46E+00	1.35E-01	2.98E-02	1.30E-04	1.27E-01	5.00E-01	1.58E+00	5.00E+00	2.54E-01	8.05E-02	2.54E-02
Aldrin	3.30E-02	3.30E+00	1.09E-01	1.39E-01	4.60E-03	6.70E-05	5.96E-03	7.00E-02	1.57E-01	3.50E-01	8.51E-02	3.81E-02	1.70E-02
alpha-Chlordane	5.40E-04	4.00E+00	2.16E-03	1.65E-01	8.90E-05	6.70E-05	1.31E-04	2.14E+00	4.79E+00	1.07E+01	6.11E-05	2.73E-05	1.22E-05
Endosulfan II	5.70E-03	1.00E+00	5.70E-03	8.86E-01	5.05E-03	1.30E-04	6.48E-04	1.00E+01	2.24E+01	5.00E+01	6.48E-05	2.90E-05	1.30E-05
Endrin	2.80E-02	3.60E+00	1.01E-01	5.35E-01	1.50E-02	1.30E-04	6.16E-03	2.00E-02	4.47E-02	1.00E-01	3.08E-01	1.38E-01	6.16E-02
gamma-Chlordane	1.50E-02	4.00E+00	6.00E-02	1.65E-01	2.47E-03	6.70E-05	3.27E-03	2.14E+00	4.79E+00	1.07E+01	1.53E-03	6.83E-04	3.05E-04
Semivolatile Organics													
Acenaphthene	3.30E-01	3.00E-01	9.90E-02	1.55E+00	5.12E-01	6.90E-05	3.76E-02	7.10E+00	1.59E+01	3.55E+01	5.29E-03	2.37E-03	1.06E-03
Anthracene	5.30E-01	3.20E-01	1.70E-01	8.61E-01	4.56E-01	2.00E-04	3.89E-02	7.10E+00	1.59E+01	3.55E+01	5.47E-03	2.45E-03	1.09E-03
Benzo(a)anthracene	1.10E+00	2.70E-01	2.97E-01	2.94E-01	3.24E-01	3.40E-04	4.04E-02	7.10E+00	1.59E+01	3.55E+01	5.69E-03	2.54E-03	1.14E-03
Benzo(a)pyrene	2.30E+00	3.40E-01	7.82E-01	2.01E-01	4.61E-01	2.40E-04	7.95E-02	7.10E+00	1.59E+01	3.55E+01	1.12E-02	5.01E-03	2.24E-03
Benzo(b)fluoranthene	1.70E+00	2.10E-01	3.57E-01	3.10E-01	5.27E-01	5.80E-04	5.89E-02	7.10E+00	1.59E+01	3.55E+01	8.29E-03	3.71E-03	1.66E-03
Benzo(g,h,i)perylene	1.20E+00	1.50E-01	1.80E-01	1.16E-01	1.39E-01	1.60E-04	2.38E-02	7.10E+00	1.59E+01	3.55E+01	3.36E-03	1.50E-03	6.72E-04
Benzo(k)fluoranthene	1.70E+00	2.10E-01	3.57E-01	1.84E-01	3.13E-01	1.50E-04	4.59E-02	7.10E+00	1.59E+01	3.55E+01	6.47E-03	2.89E-03	1.29E-03
Chrysene	2.20E+00	4.40E-01	9.68E-01	2.94E-01	6.47E-01	8.00E-05	9.95E-02	7.10E+00	1.59E+01	3.55E+01	1.40E-02	6.27E-03	2.80E-03
Dibenz(a,h)anthracene	1.30E-02	4.90E-01	6.37E-03	1.30E-01	1.69E-03	2.00E-04	5.33E-04	7.10E+00	1.59E+01	3.55E+01	7.50E-05	3.36E-05	1.50E-05
Fluoranthene	2.70E+00	3.70E-01	9.99E-01	5.00E-01	1.35E+00	3.20E-04	1.46E-01	7.10E+00	1.59E+01	3.55E+01	2.06E-02	9.20E-03	4.11E-03
Fluorene	2.50E-01	2.00E-01	5.00E-02	1.18E+00	2.96E-01	2.00E-04	2.17E-02	7.10E+00	1.59E+01	3.55E+01	3.05E-03	1.37E-03	6.11E-04
Indeno(1,2,3-cd)pyrene	1.30E+00	4.10E-01	5.33E-01	1.10E-01	1.43E-01	2.40E-04	4.25E-02	7.10E+00	1.59E+01	3.55E+01	5.98E-03	2.67E-03	1.20E-03
Phenanthrene	2.40E+00	2.80E-01	6.72E-01	8.61E-01	2.07E+00	8.80E-05	1.71E-01	7.10E+00	1.59E+01	3.55E+01	2.41E-02	1.08E-02	4.82E-03
Pyrene	3.00E+00	3.90E-01	1.17E+00	7.20E-01	2.16E+00	2.90E-04	2.05E-01	7.10E+00	1.59E+01	3.55E+01	2.89E-02	1.29E-02	5.77E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0074	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis
PDFi =	0.435	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.519	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.046	= Proportion of diet composed of soil
WIR =	0.0129	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0635	= Body weight (kg)

TABLE B-1-6
Summary of Red-tailed Hawk Exposure Doses - Screening (Step 2)
Site 4

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	6.40E+00	5.23E-01	3.35E+00	1.10E+00	7.06E+00	See footenote	9.58E-02	5.80E-02	8.07E-03	2.46E+00	4.26E+00	7.38E+00	3.28E-03	1.90E-03	1.09E-03
Cadmium	3.30E+00	4.07E+01	1.34E+02	3.25E+00	1.07E+01	See footenote	8.72E+00	8.20E-04	3.60E-01	1.45E+00	5.39E+00	2.00E+01	2.48E-01	6.69E-02	1.80E-02
Chromium	4.52E+01	3.16E+00	1.43E+02	8.39E-02	3.79E+00	See footenote	1.49E+01	6.30E-03	6.17E-01	1.00E+00	2.24E+00	5.00E+00	6.17E-01	2.76E-01	1.23E-01
Copper	1.50E+02	1.53E+00	2.30E+02	6.25E-01	9.38E+01	See footenote	1.48E+02	2.59E-02	6.12E+00	4.70E+01	5.39E+01	6.17E+01	1.30E-01	1.14E-01	9.91E-02
Lead	1.29E+02	1.52E+00	1.96E+02	4.68E-01	6.04E+01	See footenote	3.49E+01	5.90E-03	1.44E+00	3.85E+00	8.61E+00	1.93E+01	3.75E-01	1.68E-01	7.49E-02
Mercury	8.80E-01	2.06E+01	1.82E+01	5.00E+00	4.40E+00	See footenote	1.51E-01	2.00E-04	6.24E-03	4.90E-01	7.67E-01	1.20E+00	1.27E-02	8.14E-03	5.20E-03
Nickel	1.21E+01	4.73E+00	5.72E+01	1.41E+00	1.71E+01	See footenote	8.33E+00	3.50E-03	3.44E-01	7.74E+01	9.10E+01	1.07E+02	4.45E-03	3.78E-03	3.22E-03
Selenium	1.00E+00	1.34E+00	1.34E+00	3.01E+00	3.01E+00	See footenote	1.21E+00	1.30E-03	5.01E-02	4.40E-01	6.80E-01	1.05E+00	1.14E-01	7.38E-02	4.78E-02
Zinc	3.24E+02	1.29E+01	4.17E+03	1.82E+00	5.90E+02	See footenote	8.64E+02	6.54E-02	3.57E+01	1.45E+01	4.36E+01	1.31E+02	**2.46E+00**	8.19E-01	2.72E-01
Polychlorinated Biphenyls															
Aroclor-1242	1.00E+00	1.59E+01	1.59E+01	3.23E-01	3.23E-01	See footenote	7.18E+00	8.00E-04	2.97E-01	4.10E-01	9.17E-01	2.05E+00	7.24E-01	3.24E-01	1.45E-01
Aroclor-1260	2.70E+00	1.59E+01	4.30E+01	1.05E-01	2.84E-01	See footenote	1.91E+01	8.00E-04	7.89E-01	4.10E-01	9.17E-01	2.05E+00	**1.92E+00**	8.60E-01	3.85E-01
Pesticides															
4,4'-DDE	4.30E-02	1.12E+01	4.82E-01	1.09E-01	4.70E-03	See footenote	2.16E-01	1.30E-04	8.91E-03	8.00E-02	1.79E-01	4.00E-01	1.11E-01	4.98E-02	2.23E-02
4,4'-DDT	2.20E-01	1.12E+01	2.46E+00	1.35E-01	2.98E-02	See footenote	1.11E+00	1.30E-04	4.57E-02	8.00E-02	1.79E-01	4.00E-01	5.71E-01	2.55E-01	1.14E-01
Aldrin	3.30E-02	3.30E+00	1.09E-01	1.39E-01	4.60E-03	See footenote	5.19E-02	6.70E-05	2.15E-03	7.00E-02	1.57E-01	3.50E-01	3.07E-02	1.37E-02	6.14E-03
alpha-Chlordane	5.40E-04	4.00E+00	2.16E-03	1.65E-01	8.90E-05	See footenote	1.02E-03	6.70E-05	4.69E-05	2.14E+00	4.79E+00	1.07E+01	2.19E-05	9.81E-06	4.39E-06
Endosulfan II	5.70E-03	1.00E+00	5.70E-03	8.86E-01	5.05E-03	See footenote	5.37E-03	1.30E-04	2.31E-04	1.00E+01	2.24E+01	5.00E+01	2.31E-05	1.03E-05	4.62E-06
Endrin	2.80E-02	3.60E+00	1.01E-01	5.35E-01	1.50E-02	See footenote	5.33E-02	1.30E-04	2.21E-03	2.00E-02	4.47E-02	1.00E-01	1.10E-01	4.94E-02	2.21E-02
gamma-Chlordane	1.50E-02	4.00E+00	6.00E-02	1.65E-01	2.47E-03	See footenote	2.84E-02	6.70E-05	1.18E-03	2.14E+00	4.79E+00	1.07E+01	5.50E-04	2.46E-04	1.10E-04
Semivolatile Organics															
Acenaphthene	3.30E-01	3.00E-01	9.90E-02	1.55E+00	5.12E-01	See footenote	0.00E+00	6.90E-05	4.90E-06	7.10E+00	1.59E+01	3.55E+01	6.90E-07	3.09E-07	1.38E-07
Anthracene	5.30E-01	3.20E-01	1.70E-01	8.61E-01	4.56E-01	See footenote	0.00E+00	2.00E-04	1.42E-05	7.10E+00	1.59E+01	3.55E+01	2.00E-06	8.95E-07	4.00E-07
Benzo(a)anthracene	1.10E+00	2.70E-01	2.97E-01	2.94E-01	3.24E-01	See footenote	0.00E+00	3.40E-04	2.41E-05	7.10E+00	1.59E+01	3.55E+01	3.40E-06	1.52E-06	6.80E-07
Benzo(a)pyrene	2.30E+00	3.40E-01	7.82E-01	2.01E-01	4.61E-01	See footenote	0.00E+00	2.40E-04	1.70E-05	7.10E+00	1.59E+01	3.55E+01	2.40E-06	1.07E-06	4.80E-07
Benzo(b)fluoranthene	1.70E+00	2.10E-01	3.57E-01	3.10E-01	5.27E-01	See footenote	0.00E+00	5.80E-04	4.12E-05	7.10E+00	1.59E+01	3.55E+01	5.80E-06	2.59E-06	1.16E-06
Benzo(g,h,i)perylene	1.20E+00	1.50E-01	1.80E-01	1.16E-01	1.39E-01	See footenote	0.00E+00	1.60E-04	1.14E-05	7.10E+00	1.59E+01	3.55E+01	1.60E-06	7.16E-07	3.20E-07
Benzo(k)fluoranthene	1.70E+00	2.10E-01	3.57E-01	1.84E-01	3.13E-01	See footenote	0.00E+00	1.50E-04	1.07E-05	7.10E+00	1.59E+01	3.55E+01	1.50E-06	6.71E-07	3.00E-07
Chrysene	2.20E+00	4.40E-01	9.68E-01	2.94E-01	6.47E-01	See footenote	0.00E+00	8.00E-05	5.68E-06	7.10E+00	1.59E+01	3.55E+01	8.00E-07	3.58E-07	1.60E-07
Dibenz(a,h)anthracene	1.30E-02	4.90E-01	6.37E-03	1.30E-01	1.69E-03	See footenote	0.00E+00	2.00E-04	1.42E-05	7.10E+00	1.59E+01	3.55E+01	2.00E-06	8.95E-07	4.00E-07
Fluoranthene	2.70E+00	3.70E-01	9.99E-01	5.00E-01	1.35E+00	See footenote	0.00E+00	3.20E-04	2.27E-05	7.10E+00	1.59E+01	3.55E+01	3.20E-06	1.43E-06	6.40E-07
Fluorene	2.50E-01	2.00E-01	5.00E-02	1.18E+00	2.96E-01	See footenote	0.00E+00	2.00E-04	1.42E-05	7.10E+00	1.59E+01	3.55E+01	2.00E-06	8.95E-07	4.00E-07
Indeno(1,2,3-cd)pyrene	1.30E+00	4.10E-01	5.33E-01	1.10E-01	1.43E-01	See footenote	0.00E+00	2.40E-04	1.70E-05	7.10E+00	1.59E+01	3.55E+01	2.40E-06	1.07E-06	4.80E-07
Phenanthrene	2.40E+00	2.80E-01	6.72E-01	8.61E-01	2.07E+00	See footenote	0.00E+00	8.80E-05	6.25E-06	7.10E+00	1.59E+01	3.55E+01	8.80E-07	3.94E-07	1.76E-07
Pyrene	3.00E+00	3.90E-01	1.17E+00	7.20E-01	2.16E+00	See footenote	0.00E+00	2.90E-04	2.06E-05	7.10E+00	1.59E+01	3.55E+01	2.90E-06	1.30E-06	5.80E-07

Assumes equal proportionss of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0395 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
WIR = 0.0680 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.957 = Body weight (kg)

TABLE B-2-1
Summary of Meadow Vole Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Site 4

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.03E+00	2.58E-01	7.82E-01	3.71E-02	1.12E-01	6.88E-03	1.10E-02	2.52E-01	5.63E-01	1.26E+00	4.36E-02	1.95E-02	8.73E-03	5.42E-03	1.64E-02
Cadmium	6.57E-01	7.66E+00	5.03E+00	5.86E-01	3.85E-01	3.24E-04	2.37E-02	1.00E+00	3.16E+00	1.00E+01	2.37E-02	7.49E-03	2.37E-03	1.34E-01	8.80E-02
Chromium	1.62E+01	3.20E-01	5.18E+00	4.10E-02	6.64E-01	1.20E-03	5.53E-02	3.28E+00	7.33E+00	1.64E+01	1.68E-02	7.53E-03	3.37E-03	8.84E-02	1.43E+00
Lead	2.83E+01	3.07E-01	8.68E+00	3.90E-02	1.10E+00	1.30E-03	9.34E-02	8.00E+00	2.53E+01	8.00E+01	1.17E-02	3.69E-03	1.17E-03	4.06E-02	1.15E+00
Mercury	2.25E-01	1.19E+00	2.67E-01	6.52E-01	1.47E-01	1.00E-04	7.39E-03	3.20E-02	7.16E-02	1.60E-01	2.31E-01	1.03E-01	4.62E-02	6.72E-02	1.51E-02
Selenium	3.71E-01	9.82E-01	3.64E-01	5.67E-01	2.10E-01	1.96E-03	1.10E-02	2.00E-01	2.57E-01	3.30E-01	5.50E-02	4.29E-02	3.34E-02	2.73E-01	1.01E-01
Zinc	8.21E+01	2.48E+00	2.04E+02	3.58E-01	2.94E+01	2.00E-02	1.67E+00	1.60E+02	2.26E+02	3.20E+02	1.04E-02	7.38E-03	5.22E-03	2.93E-01	2.40E+01
Polychlorinated Biphenyls															
Aroclor-1242	1.14E-01	4.30E+00	4.88E-01	3.23E-01	3.67E-02	3.20E-04	2.39E-03	1.36E-01	3.04E-01	6.80E-01	1.76E-02	7.86E-03	3.51E-03	See footnote	4.76E-02
Aroclor-1260	3.59E-01	4.30E+00	1.54E+00	1.05E-01	3.78E-02	3.20E-04	3.76E-03	1.36E-01	3.04E-01	6.80E-01	2.76E-02	1.23E-02	5.52E-03	See footnote	7.56E-02

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0021 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.020 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.956 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.024 = Proportion of diet composed of soil
WIR = 0.0090 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0428 = Body weight (kg)

TABLE B-2-2
Summary of Short-tailed Shrew Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Site 4

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.03E+00	2.58E-01	7.82E-01	3.71E-02	1.12E-01	6.88E-03	9.38E-02	2.52E-01	5.63E-01	1.26E+00	3.72E-01	1.66E-01	7.44E-02	3.87E-03	1.17E-02
Cadmium	6.57E-01	7.66E+00	5.03E+00	5.86E-01	3.85E-01	3.24E-04	3.75E-01	1.00E+00	3.16E+00	1.00E+01	3.75E-01	1.19E-01	3.75E-02	2.21E+00	1.45E+00
Chromium	1.62E+01	3.20E-01	5.18E+00	4.10E-02	6.64E-01	1.20E-03	5.67E-01	3.28E+00	7.33E+00	1.64E+01	1.73E-01	7.73E-02	3.46E-02	8.50E-02	1.38E+00
Lead	2.83E+01	3.07E-01	8.68E+00	3.90E-02	1.10E+00	1.30E-03	9.63E-01	8.00E+00	2.53E+01	8.00E+01	1.20E-01	3.80E-02	1.20E-02	1.48E-01	4.18E+00
Mercury	2.25E-01	1.19E+00	2.67E-01	6.52E-01	1.47E-01	1.00E-04	2.27E-02	3.20E-02	7.16E-02	1.60E-01	7.08E-01	3.17E-01	1.42E-01	6.72E-02	1.51E-02
Selenium	3.71E-01	9.82E-01	3.64E-01	5.67E-01	2.10E-01	1.96E-03	3.21E-02	2.00E-01	2.57E-01	3.30E-01	1.60E-01	1.25E-01	9.72E-02	2.73E-01	1.01E-01
Zinc	8.21E+01	2.48E+00	2.04E+02	3.58E-01	2.94E+01	2.00E-02	1.59E+01	1.60E+02	2.26E+02	3.20E+02	9.94E-02	7.03E-02	4.97E-02	8.62E-01	7.08E+01
Polychlorinated Biphenyls															
Aroclor-1242	1.14E-01	4.30E+00	4.88E-01	3.23E-01	3.67E-02	3.20E-04	3.71E-02	1.36E-01	3.04E-01	6.80E-01	2.73E-01	1.22E-01	5.46E-02	See footnote	4.18E-01
Aroclor-1260	3.59E-01	4.30E+00	1.54E+00	1.05E-01	3.78E-02	3.20E-04	1.17E-01	1.36E-01	3.04E-01	6.80E-01	8.58E-01	3.84E-01	1.72E-01	See footnote	1.32E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0015	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.823	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.047	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.130	= Proportion of diet composed of soil
WIR =	0.0038	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.01687	= Body weight (kg)

TABLE B-2-3

Summary of White-footed Mouse Exposure Doses - Baseline (Step 3A) - Arithmetic Mean

Site 4

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.03E+00	2.58E-01	7.82E-01	3.71E-02	1.12E-01	6.88E-03	1.37E-02	2.52E-01	5.63E-01	1.26E+00	5.44E-02	2.43E-02	1.09E-02	3.26E-03	9.89E-03
Cadmium	6.57E-01	7.66E+00	5.03E+00	5.86E-01	3.85E-01	3.24E-04	6.18E-02	1.00E+00	3.16E+00	1.00E+01	6.18E-02	1.96E-02	6.18E-03	1.44E-01	9.45E-02
Chromium	1.62E+01	3.20E-01	5.18E+00	4.10E-02	6.64E-01	1.20E-03	7.47E-02	3.28E+00	7.33E+00	1.64E+01	2.28E-02	1.02E-02	4.55E-03	7.00E-02	1.13E+00
Lead	2.83E+01	3.07E-01	8.68E+00	3.90E-02	1.10E+00	1.30E-03	1.25E-01	8.00E+00	2.53E+01	8.00E+01	1.57E-02	4.96E-03	1.57E-03	5.48E-02	1.55E+00
Mercury	2.25E-01	1.19E+00	2.67E-01	6.52E-01	1.47E-01	1.00E-04	4.94E-03	3.20E-02	7.16E-02	1.60E-01	1.54E-01	6.91E-02	3.09E-02	5.43E-02	1.22E-02
Selenium	3.71E-01	9.82E-01	3.64E-01	5.67E-01	2.10E-01	1.96E-03	7.44E-03	2.00E-01	2.57E-01	3.30E-01	3.72E-02	2.90E-02	2.25E-02	2.58E-01	9.55E-02
Zinc	8.21E+01	2.48E+00	2.04E+02	3.58E-01	2.94E+01	2.00E-02	2.70E+00	1.60E+02	2.26E+02	3.20E+02	1.69E-02	1.19E-02	8.44E-03	5.09E-01	4.18E+01
Polychlorinated Biphenyls															
Aroclor-1242	1.14E-01	4.30E+00	4.88E-01	3.23E-01	3.67E-02	3.20E-04	6.11E-03	1.36E-01	3.04E-01	6.80E-01	4.49E-02	2.01E-02	8.98E-03	See footnote	2.51E-01
Aroclor-1260	3.59E-01	4.30E+00	1.54E+00	1.05E-01	3.78E-02	3.20E-04	1.81E-02	1.36E-01	3.04E-01	6.80E-01	1.33E-01	5.96E-02	2.66E-02	See footnote	7.51E-01

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0005	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.470	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.510	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.020	= Proportion of diet composed of soil
WIR =	0.0062	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0208	= Body weight (kg)

TABLE B-2-4
Summary of Red Fox Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Site 4

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	3.03E+00	2.58E-01	7.82E-01	3.71E-02	1.12E-01	See footenote	1.27E-02	6.88E-03	4.40E-03	1.20E+00	2.68E+00	6.00E+00	3.67E-03	1.64E-03	7.34E-04
Cadmium	6.57E-01	7.66E+00	5.03E+00	5.86E-01	3.85E-01	See footenote	5.45E-01	3.24E-04	2.01E-02	7.50E-01	1.68E+00	3.75E+00	2.68E-02	1.20E-02	5.36E-03
Chromium	1.62E+01	3.20E-01	5.18E+00	4.10E-02	6.64E-01	See footenote	1.31E+00	1.20E-03	5.45E-02	3.28E+00	7.33E+00	1.64E+01	1.66E-02	7.42E-03	3.32E-03
Lead	2.83E+01	3.07E-01	8.68E+00	3.90E-02	1.10E+00	See footenote	2.29E+00	1.30E-03	9.46E-02	8.00E+00	2.53E+01	8.00E+01	1.18E-02	3.74E-03	1.18E-03
Mercury	2.25E-01	1.19E+00	2.67E-01	6.52E-01	1.47E-01	See footenote	1.41E-02	1.00E-04	1.11E-03	1.50E-01	1.94E-01	2.50E-01	7.42E-03	5.74E-03	4.45E-03
Selenium	3.71E-01	9.82E-01	3.64E-01	5.67E-01	2.10E-01	See footenote	9.93E-02	1.96E-03	3.87E-03	2.00E-01	2.57E-01	3.30E-01	1.93E-02	1.51E-02	1.17E-02
Zinc	8.21E+01	2.48E+00	2.04E+02	3.58E-01	2.94E+01	See footenote	4.55E+01	2.00E-02	1.51E+00	2.08E+01	4.65E+01	1.04E+02	7.28E-02	3.25E-02	1.46E-02
Polychlorinated Biphenyls															
Aroclor-1242	1.14E-01	4.30E+00	4.88E-01	3.23E-01	3.67E-02	See footenote	2.39E-01	3.20E-04	6.94E-03	1.38E-01	3.09E-01	6.90E-01	5.03E-02	2.25E-02	1.01E-02
Aroclor-1260	3.59E-01	4.30E+00	1.54E+00	1.05E-01	3.78E-02	See footenote	7.15E-01	3.20E-04	2.07E-02	1.40E-01	3.11E-01	6.90E-01	1.48E-01	6.65E-02	2.99E-02

Assumes equal proportions of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1231 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.028 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 0.874 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.028 = Proportion of diet composed of soil
WIR = 0.3494 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 4.06 = Body weight (kg)

TABLE B-2-5
Summary of American Robin Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Site 4

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Arsenic	3.03E+00	2.58E-01	7.82E-01	3.71E-02	1.12E-01	6.88E-03	3.94E-02	2.46E+00	4.26E+00	7.38E+00	1.60E-02	9.24E-03	5.33E-03
Cadmium	6.57E-01	7.66E+00	5.03E+00	5.86E-01	3.85E-01	3.24E-04	1.73E-01	1.45E+00	5.39E+00	2.00E+01	1.19E-01	3.21E-02	8.64E-03
Chromium	1.62E+01	3.20E-01	5.18E+00	4.10E-02	6.64E-01	1.20E-03	2.39E-01	1.00E+00	2.24E+00	5.00E+00	2.39E-01	1.07E-01	4.78E-02
Lead	2.83E+01	3.07E-01	8.68E+00	3.90E-02	1.10E+00	1.30E-03	4.04E-01	3.85E+00	8.61E+00	1.93E+01	1.05E-01	4.69E-02	2.10E-02
Mercury	2.25E-01	1.19E+00	2.67E-01	6.52E-01	1.47E-01	1.00E-04	1.45E-02	4.90E-01	7.67E-01	1.20E+00	2.96E-02	1.89E-02	1.21E-02
Selenium	3.71E-01	9.82E-01	3.64E-01	5.67E-01	2.10E-01	1.96E-03	2.06E-02	4.40E-01	6.80E-01	1.05E+00	4.68E-02	3.03E-02	1.96E-02
Zinc	8.21E+01	2.48E+00	2.04E+02	3.58E-01	2.94E+01	2.00E-02	7.69E+00	1.45E+01	4.36E+01	1.31E+02	5.31E-01	1.77E-01	5.87E-02
Polychlorinated Biphenyls													
Aroclor-1242	1.14E-01	4.30E+00	4.88E-01	3.23E-01	3.67E-02	3.20E-04	1.70E-02	4.10E-01	9.17E-01	2.05E+00	4.14E-02	1.85E-02	8.27E-03
Aroclor-1260	3.59E-01	4.30E+00	1.54E+00	1.05E-01	3.78E-02	3.20E-04	5.06E-02	4.10E-01	9.17E-01	2.05E+00	1.23E-01	5.51E-02	2.47E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0055 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.435 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.519 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.046 = Proportion of diet composed of soil
WIR = 0.0106 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0773 = Body weight (kg)

TABLE B-2-6
Summary of Red-tailed Hawk Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Site 4

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	3.03E+00	2.58E-01	7.82E-01	3.71E-02	1.12E-01	See footenote	1.27E-02	6.88E-03	7.96E-04	2.46E+00	4.26E+00	7.38E+00	3.24E-04	1.87E-04	1.08E-04
Cadmium	6.57E-01	7.66E+00	5.03E+00	5.86E-01	3.85E-01	See footenote	5.45E-01	3.24E-04	1.75E-02	1.45E+00	5.39E+00	2.00E+01	1.20E-02	3.24E-03	8.73E-04
Chromium	1.62E+01	3.20E-01	5.18E+00	4.10E-02	6.64E-01	See footenote	1.31E+00	1.20E-03	4.21E-02	1.00E+00	2.24E+00	5.00E+00	4.21E-02	1.88E-02	8.42E-03
Lead	2.83E+01	3.07E-01	8.68E+00	3.90E-02	1.10E+00	See footenote	2.29E+00	1.30E-03	7.34E-02	3.85E+00	8.61E+00	1.93E+01	1.91E-02	8.53E-03	3.82E-03
Mercury	2.25E-01	1.19E+00	2.67E-01	6.52E-01	1.47E-01	See footenote	1.41E-02	1.00E-04	4.58E-04	4.90E-01	7.67E-01	1.20E+00	9.35E-04	5.98E-04	3.82E-04
Selenium	3.71E-01	9.82E-01	3.64E-01	5.67E-01	2.10E-01	See footenote	9.93E-02	1.96E-03	3.29E-03	4.40E-01	6.80E-01	1.05E+00	7.47E-03	4.84E-03	3.13E-03
Zinc	8.21E+01	2.48E+00	2.04E+02	3.58E-01	2.94E+01	See footenote	4.55E+01	2.00E-02	1.46E+00	1.45E+01	4.36E+01	1.31E+02	1.01E-01	3.35E-02	1.11E-02
Polychlorinated Biphenyls															
Aroclor-1242	1.14E-01	4.30E+00	4.88E-01	3.23E-01	3.67E-02	See footenote	2.39E-01	3.20E-04	7.66E-03	4.10E-01	9.17E-01	2.05E+00	1.87E-02	8.36E-03	3.74E-03
Aroclor-1260	3.59E-01	4.30E+00	1.54E+00	1.05E-01	3.78E-02	See footenote	7.15E-01	3.20E-04	2.29E-02	4.10E-01	9.17E-01	2.05E+00	5.58E-02	2.50E-02	1.12E-02

Assumes equal proportionss of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0360 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
WIR = 0.0639 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 1.126 = Body weight (kg)

TABLE B-3-1
Summary of Meadow Vole Exposure Doses - Baseline (Step 3A) - 95% UCL
Site 4

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.93E+00	2.58E-01	1.01E+00	3.71E-02	1.46E-01	1.46E-02	1.54E-02	2.52E-01	5.63E-01	1.26E+00	6.13E-02	2.74E-02	1.23E-02	5.42E-03	2.13E-02
Cadmium	1.21E+00	7.66E+00	9.30E+00	5.86E-01	7.11E-01	4.29E-04	4.38E-02	1.00E+00	3.16E+00	1.00E+01	4.38E-02	1.38E-02	4.38E-03	1.34E-01	1.63E-01
Chromium	2.31E+01	3.20E-01	7.40E+00	4.10E-02	9.47E-01	1.55E-03	7.88E-02	3.28E+00	7.33E+00	1.64E+01	2.40E-02	1.07E-02	4.81E-03	8.84E-02	2.04E+00
Lead	4.95E+01	3.07E-01	1.52E+01	3.90E-02	1.93E+00	2.07E-03	1.63E-01	8.00E+00	2.53E+01	8.00E+01	2.04E-02	6.46E-03	2.04E-03	4.06E-02	2.01E+00
Mercury	4.17E-01	1.19E+00	4.95E-01	6.52E-01	2.72E-01	1.00E-04	1.37E-02	3.20E-02	7.16E-02	1.60E-01	4.28E-01	1.91E-01	8.55E-02	6.72E-02	2.80E-02
Selenium	5.05E-01	9.82E-01	4.96E-01	5.67E-01	2.86E-01	2.32E-03	1.49E-02	2.00E-01	2.57E-01	3.30E-01	7.46E-02	5.81E-02	4.52E-02	2.73E-01	1.38E-01
Zinc	1.51E+02	2.48E+00	3.74E+02	3.58E-01	5.39E+01	2.76E-02	3.06E+00	1.60E+02	2.26E+02	3.20E+02	1.91E-02	1.35E-02	9.56E-03	2.93E-01	4.41E+01
Polychlorinated Biphenyls															
Aroclor-1242	2.94E-01	4.30E+00	1.26E+00	3.23E-01	9.50E-02	3.41E-04	6.08E-03	1.36E-01	3.04E-01	6.80E-01	4.47E-02	2.00E-02	8.95E-03	See footnote	1.23E-01
Aroclor-1260	8.47E-01	4.30E+00	3.64E+00	1.05E-01	8.91E-02	3.41E-04	8.78E-03	1.36E-01	3.04E-01	6.80E-01	6.45E-02	2.89E-02	1.29E-02	See footnote	1.78E-01

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0021	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.020	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.956	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.024	= Proportion of diet composed of soil
WIR =	0.0090	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0428	= Body weight (kg)

TABLE B-3-2
Summary of Short-tailed Shrew Exposure Doses - Baseline (Step 3A) - 95% UCL
Site 4

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.93E+00	2.58E-01	1.01E+00	3.71E-02	1.46E-01	1.46E-02	1.23E-01	2.52E-01	5.63E-01	1.26E+00	4.88E-01	2.18E-01	9.75E-02	3.87E-03	1.52E-02
Cadmium	1.21E+00	7.66E+00	9.30E+00	5.86E-01	7.11E-01	4.29E-04	6.94E-01	1.00E+00	3.16E+00	1.00E+01	6.94E-01	2.20E-01	6.94E-02	2.21E+00	2.69E+00
Chromium	2.31E+01	3.20E-01	7.40E+00	4.10E-02	9.47E-01	1.55E-03	8.09E-01	3.28E+00	7.33E+00	1.64E+01	2.47E-01	1.10E-01	4.93E-02	8.50E-02	1.96E+00
Lead	4.95E+01	3.07E-01	1.52E+01	3.90E-02	1.93E+00	2.07E-03	1.69E+00	8.00E+00	2.53E+01	8.00E+01	2.11E-01	6.66E-02	2.11E-02	1.48E-01	7.32E+00
Mercury	4.17E-01	1.19E+00	4.95E-01	6.52E-01	2.72E-01	1.00E-04	4.20E-02	3.20E-02	7.16E-02	1.60E-01	**1.31E+00**	5.87E-01	2.62E-01	6.72E-02	2.80E-02
Selenium	5.05E-01	9.82E-01	4.96E-01	5.67E-01	2.86E-01	2.32E-03	4.36E-02	2.00E-01	2.57E-01	3.30E-01	2.18E-01	1.70E-01	1.32E-01	2.73E-01	1.38E-01
Zinc	1.51E+02	2.48E+00	3.74E+02	3.58E-01	5.39E+01	2.76E-02	2.92E+01	1.60E+02	2.26E+02	3.20E+02	1.82E-01	1.29E-01	9.12E-02	8.62E-01	1.30E+02
Polychlorinated Biphenyls															
Aroclor-1242	2.94E-01	4.30E+00	1.26E+00	3.23E-01	9.50E-02	3.41E-04	9.59E-02	1.36E-01	3.04E-01	6.80E-01	7.05E-01	3.16E-01	1.41E-01	See footnote	1.08E+00
Aroclor-1260	8.47E-01	4.30E+00	3.64E+00	1.05E-01	8.91E-02	3.41E-04	2.75E-01	1.36E-01	3.04E-01	6.80E-01	**2.02E+00**	9.05E-01	4.05E-01	See footnote	3.11E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0015	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.823	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.047	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.130	= Proportion of diet composed of soil
WIR =	0.0038	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.01687	= Body weight (kg)

TABLE B-3-3
Summary of White-footed Mouse Exposure Doses - Baseline (Step 3A) - 95% UCL
Site 4

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.93E+00	2.58E-01	1.01E+00	3.71E-02	1.46E-01	1.46E-02	1.95E-02	2.52E-01	5.63E-01	1.26E+00	7.72E-02	3.45E-02	1.54E-02	3.26E-03	1.28E-02
Cadmium	1.21E+00	7.66E+00	9.30E+00	5.86E-01	7.11E-01	4.29E-04	1.14E-01	1.00E+00	3.16E+00	1.00E+01	1.14E-01	3.61E-02	1.14E-02	1.44E-01	1.75E-01
Chromium	2.31E+01	3.20E-01	7.40E+00	4.10E-02	9.47E-01	1.55E-03	1.07E-01	3.28E+00	7.33E+00	1.64E+01	3.25E-02	1.45E-02	6.50E-03	7.00E-02	1.62E+00
Lead	4.95E+01	3.07E-01	1.52E+01	3.90E-02	1.93E+00	2.07E-03	2.19E-01	8.00E+00	2.53E+01	8.00E+01	2.74E-02	8.68E-03	2.74E-03	5.48E-02	2.72E+00
Mercury	4.17E-01	1.19E+00	4.95E-01	6.52E-01	2.72E-01	1.00E-04	9.14E-03	3.20E-02	7.16E-02	1.60E-01	2.86E-01	1.28E-01	5.71E-02	5.43E-02	2.26E-02
Selenium	5.05E-01	9.82E-01	4.96E-01	5.67E-01	2.86E-01	2.32E-03	1.00E-02	2.00E-01	2.57E-01	3.30E-01	5.01E-02	3.90E-02	3.04E-02	2.58E-01	1.30E-01
Zinc	1.51E+02	2.48E+00	3.74E+02	3.58E-01	5.39E+01	2.76E-02	4.95E+00	1.60E+02	2.26E+02	3.20E+02	3.10E-02	2.19E-02	1.55E-02	5.09E-01	7.67E+01
Polychlorinated Biphenyls															
Aroclor-1242	2.94E-01	4.30E+00	1.26E+00	3.23E-01	9.50E-02	3.41E-04	1.57E-02	1.36E-01	3.04E-01	6.80E-01	1.15E-01	5.15E-02	2.30E-02	See footnote	6.49E-01
Aroclor-1260	8.47E-01	4.30E+00	3.64E+00	1.05E-01	8.91E-02	3.41E-04	4.26E-02	1.36E-01	3.04E-01	6.80E-01	3.13E-01	1.40E-01	6.27E-02	See footnote	1.77E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0005 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.470 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.510 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.020 = Proportion of diet composed of soil
WIR = 0.0062 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0208 = Body weight (kg)

TABLE B-3-4
Summary of Red Fox Exposure Doses - Baseline (Step 3A) - 95% UCL
Site 4

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	3.93E+00	2.58E-01	1.01E+00	3.71E-02	1.46E-01	See footenote	1.64E-02	1.46E-02	6.19E-03	1.20E+00	2.68E+00	6.00E+00	5.16E-03	2.31E-03	1.03E-03
Cadmium	1.21E+00	7.66E+00	9.30E+00	5.86E-01	7.11E-01	See footenote	1.01E+00	4.29E-04	3.72E-02	7.50E-01	1.68E+00	3.75E+00	4.96E-02	2.22E-02	9.91E-03
Chromium	2.31E+01	3.20E-01	7.40E+00	4.10E-02	9.47E-01	See footenote	1.87E+00	1.55E-03	7.77E-02	3.28E+00	7.33E+00	1.64E+01	2.37E-02	1.06E-02	4.74E-03
Lead	4.95E+01	3.07E-01	1.52E+01	3.90E-02	1.93E+00	See footenote	4.02E+00	2.07E-03	1.66E-01	8.00E+00	2.53E+01	8.00E+01	2.07E-02	6.55E-03	2.07E-03
Mercury	4.17E-01	1.19E+00	4.95E-01	6.52E-01	2.72E-01	See footenote	2.62E-02	1.00E-04	2.05E-03	1.50E-01	1.94E-01	2.50E-01	1.37E-02	1.06E-02	8.22E-03
Selenium	5.05E-01	9.82E-01	4.96E-01	5.67E-01	2.86E-01	See footenote	1.35E-01	2.32E-03	5.24E-03	2.00E-01	2.57E-01	3.30E-01	2.62E-02	2.04E-02	1.59E-02
Zinc	1.51E+02	2.48E+00	3.74E+02	3.58E-01	5.39E+01	See footenote	8.35E+01	2.76E-02	2.77E+00	2.08E+01	4.65E+01	1.04E+02	1.33E-01	5.97E-02	2.67E-02
Polychlorinated Biphenyls															
Aroclor-1242	2.94E-01	4.30E+00	1.26E+00	3.23E-01	9.50E-02	See footenote	6.18E-01	3.41E-04	1.79E-02	1.38E-01	3.09E-01	6.90E-01	1.30E-01	5.81E-02	2.60E-02
Aroclor-1260	8.47E-01	4.30E+00	3.64E+00	1.05E-01	8.91E-02	See footenote	1.69E+00	3.41E-04	4.87E-02	1.40E-01	3.11E-01	6.90E-01	3.48E-01	1.57E-01	7.06E-02

Assumes equal proportions of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1231 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.028 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 0.874 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.028 = Proportion of diet composed of soil
WIR = 0.3494 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 4.06 = Body weight (kg)

TABLE B-3-5
Summary of American Robin Exposure Doses - Baseline (Step 3A) - 95% UCL
Site 4

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Arsenic	3.93E+00	2.58E-01	1.01E+00	3.71E-02	1.46E-01	1.46E-02	5.18E-02	2.46E+00	4.26E+00	7.38E+00	2.11E-02	1.22E-02	7.02E-03
Cadmium	1.21E+00	7.66E+00	9.30E+00	5.86E-01	7.11E-01	4.29E-04	3.19E-01	1.45E+00	5.39E+00	2.00E+01	2.20E-01	5.93E-02	1.60E-02
Chromium	2.31E+01	3.20E-01	7.40E+00	4.10E-02	9.47E-01	1.55E-03	3.41E-01	1.00E+00	2.24E+00	5.00E+00	3.41E-01	1.53E-01	6.82E-02
Lead	4.95E+01	3.07E-01	1.52E+01	3.90E-02	1.93E+00	2.07E-03	7.07E-01	3.85E+00	8.61E+00	1.93E+01	1.84E-01	8.22E-02	3.67E-02
Mercury	4.17E-01	1.19E+00	4.95E-01	6.52E-01	2.72E-01	1.00E-04	2.69E-02	4.90E-01	7.67E-01	1.20E+00	5.48E-02	3.50E-02	2.24E-02
Selenium	5.05E-01	9.82E-01	4.96E-01	5.67E-01	2.86E-01	2.32E-03	2.80E-02	4.40E-01	6.80E-01	1.05E+00	6.36E-02	4.12E-02	2.67E-02
Zinc	1.51E+02	2.48E+00	3.74E+02	3.58E-01	5.39E+01	2.76E-02	1.41E+01	1.45E+01	4.36E+01	1.31E+02	9.73E-01	3.24E-01	1.08E-01
Polychlorinated Biphenyls													
Aroclor-1242	2.94E-01	4.30E+00	1.26E+00	3.23E-01	9.50E-02	3.41E-04	4.38E-02	4.10E-01	9.17E-01	2.05E+00	1.07E-01	4.78E-02	2.14E-02
Aroclor-1260	8.47E-01	4.30E+00	3.64E+00	1.05E-01	8.91E-02	3.41E-04	1.19E-01	4.10E-01	9.17E-01	2.05E+00	2.91E-01	1.30E-01	5.82E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0055	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.435	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.519	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.046	= Proportion of diet composed of soil
WIR =	0.0106	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0773	= Body weight (kg)

TABLE B-3-6
Summary of Red-tailed Hawk Exposure Doses - Baseline (Step 3A) - 95% UCL
Site 4

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	3.93E+00	2.58E-01	1.01E+00	3.71E-02	1.46E-01	See footenote	1.64E-02	1.46E-02	1.35E-03	2.46E+00	4.26E+00	7.38E+00	5.50E-04	3.17E-04	1.83E-04
Cadmium	1.21E+00	7.66E+00	9.30E+00	5.86E-01	7.11E-01	See footenote	1.01E+00	4.29E-04	3.23E-02	1.45E+00	5.39E+00	2.00E+01	2.23E-02	5.99E-03	1.61E-03
Chromium	2.31E+01	3.20E-01	7.40E+00	4.10E-02	9.47E-01	See footenote	1.87E+00	1.55E-03	6.01E-02	1.00E+00	2.24E+00	5.00E+00	6.01E-02	2.69E-02	1.20E-02
Lead	4.95E+01	3.07E-01	1.52E+01	3.90E-02	1.93E+00	See footenote	4.02E+00	2.07E-03	1.29E-01	3.85E+00	8.61E+00	1.93E+01	3.34E-02	1.49E-02	6.68E-03
Mercury	4.17E-01	1.19E+00	4.95E-01	6.52E-01	2.72E-01	See footenote	2.62E-02	1.00E-04	8.45E-04	4.90E-01	7.67E-01	1.20E+00	1.72E-03	1.10E-03	7.04E-04
Selenium	5.05E-01	9.82E-01	4.96E-01	5.67E-01	2.86E-01	See footenote	1.35E-01	2.32E-03	4.46E-03	4.40E-01	6.80E-01	1.05E+00	1.01E-02	6.56E-03	4.25E-03
Zinc	1.51E+02	2.48E+00	3.74E+02	3.58E-01	5.39E+01	See footenote	8.35E+01	2.76E-02	2.67E+00	1.45E+01	4.36E+01	1.31E+02	1.84E-01	6.14E-02	2.04E-02
Polychlorinated Biphenyls															
Aroclor-1242	2.94E-01	4.30E+00	1.26E+00	3.23E-01	9.50E-02	See footenote	6.18E-01	3.41E-04	1.98E-02	4.10E-01	9.17E-01	2.05E+00	4.83E-02	2.16E-02	9.66E-03
Aroclor-1260	8.47E-01	4.30E+00	3.64E+00	1.05E-01	8.91E-02	See footenote	1.69E+00	3.41E-04	5.40E-02	4.10E-01	9.17E-01	2.05E+00	1.32E-01	5.89E-02	2.63E-02

Assumes equal proportionss of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0360	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (terrestrial plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (small mammals, dry weight basis)
PDFi =	1.000	= Proportion of diet composed of food item (small mammals)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of soil
WIR =	0.0639	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	1.126	= Body weight (kg)

TABLE B-4-1
Summary of Raccoon Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.36E+01	6.90E-01	3.01E+01	1.10E+00	4.81E+01	1.26E-01	5.49E+00	5.80E-02	1.15E+00	1.20E+00	2.68E+00	6.00E+00	9.55E-01	4.27E-01	1.91E-01
Cadmium	5.70E+00	3.07E+00	1.75E+01	3.25E+00	1.85E+01	1.64E-01	9.35E-01	8.20E-04	4.84E-01	7.50E-01	1.68E+00	3.75E+00	6.45E-01	2.88E-01	1.29E-01
Chromium	4.97E+01	4.68E-01	2.33E+01	8.39E-02	4.17E+00	3.80E-02	1.89E+00	6.30E-03	5.14E-01	3.28E+00	7.33E+00	1.64E+01	1.57E-01	7.01E-02	3.13E-02
Copper	1.42E+02	7.96E+00	1.13E+03	6.25E-01	8.88E+01	1.00E-01	1.42E+01	2.59E-02	1.68E+01	1.17E+01	1.33E+01	1.51E+01	**1.43E+00**	**1.26E+00**	**1.11E+00**
Lead	4.17E+02	3.26E-01	1.36E+02	4.68E-01	1.95E+02	7.00E-02	2.92E+01	5.90E-03	5.52E+00	8.00E+00	2.53E+01	8.00E+01	6.90E-01	2.18E-01	6.90E-02
Mercury	6.20E-01	2.87E+00	1.78E+00	5.00E+00	3.10E+00	4.58E+00	2.84E+00	2.00E-04	7.02E-02	1.50E-01	1.94E-01	2.50E-01	4.68E-01	3.63E-01	2.81E-01
Nickel	2.36E+01	2.14E-01	5.05E+00	1.41E+00	3.33E+01	1.00E+00	2.36E+01	3.50E-03	6.00E-01	2.50E+01	3.95E+01	6.25E+01	2.40E-02	1.52E-02	9.59E-03
Selenium	1.40E+00	1.00E+00	1.40E+00	3.01E+00	4.22E+00	1.00E+00	1.40E+00	1.30E-03	7.82E-02	2.00E-01	2.57E-01	3.30E-01	3.91E-01	3.05E-01	2.37E-01
Silver	6.10E+00	1.80E-01	1.10E+00	3.67E-02	2.24E-01	1.00E+00	6.10E+00	7.00E-05	4.85E-02	9.06E+00	2.03E+01	4.53E+01	5.35E-03	2.39E-03	1.07E-03
Zinc	4.75E+02	4.76E+00	2.26E+03	1.82E+00	8.65E+02	1.47E-01	6.98E+01	6.54E-02	4.27E+01	2.08E+01	4.65E+01	1.04E+02	**2.05E+00**	9.17E-01	4.10E-01
Polychlorinated Biphenyls															
Aroclor-1248	1.90E-02	2.19E+01	4.16E-01	1.84E-01	3.50E-03	1.29E+01	2.46E-01	9.30E-04	6.36E-03	1.40E-01	3.11E-01	6.90E-01	4.55E-02	2.05E-02	9.22E-03
Aroclor-1254	2.10E+01	2.19E+01	4.60E+02	1.39E-01	2.93E+00	1.29E+01	2.72E+02	6.70E-04	6.88E+00	1.40E-01	3.11E-01	6.90E-01	**4.91E+01**	**2.21E+01**	**9.96E+00**
Aroclor-1260	1.20E+00	2.19E+01	2.63E+01	1.05E-01	1.26E-01	1.29E+01	1.55E+01	8.00E-04	3.92E-01	1.40E-01	3.11E-01	6.90E-01	**2.80E+00**	**1.26E+00**	5.69E-01
Pesticides															
4,4'-DDD	3.80E-01	3.50E-01	1.33E-01	2.02E-01	7.69E-02	2.25E+00	8.55E-01	1.30E-04	5.71E-03	1.00E+00	2.24E+00	5.00E+00	5.71E-03	2.55E-03	1.14E-03
4,4'-DDE	6.00E-01	3.36E+00	2.02E+00	1.09E-01	6.56E-02	2.62E+01	1.57E+01	1.30E-04	6.37E-02	1.00E+00	2.24E+00	5.00E+00	6.37E-02	2.85E-02	1.27E-02
4,4'-DDT	1.60E+00	2.28E+00	3.65E+00	1.35E-01	2.17E-01	8.80E+00	1.41E+01	1.30E-04	8.69E-02	1.00E+00	2.24E+00	5.00E+00	8.69E-02	3.89E-02	1.74E-02
Aldrin	8.50E-04	1.00E+00	8.50E-04	1.39E-01	1.18E-04	1.00E+00	8.50E-04	6.70E-05	2.69E-05	2.00E-01	4.47E-01	1.00E+00	1.34E-04	6.01E-05	2.69E-05
alpha-Chlordane	1.70E-02	1.00E+00	1.70E-02	1.65E-01	2.80E-03	1.00E+00	1.70E-02	6.70E-05	3.59E-04	4.58E+00	6.48E+00	9.16E+00	7.85E-05	5.55E-05	3.92E-05
Dieldrin	1.40E+00	4.92E+00	6.89E+00	4.00E-01	5.60E-01	1.00E+00	1.40E+00	1.30E-04	1.07E-01	2.80E-02	6.26E-02	1.40E-01	**3.81E+00**	**1.71E+00**	7.63E-01
Endosulfan I	5.80E-02	1.00E+00	5.80E-02	1.69E+00	9.79E-02	1.00E+00	5.80E-02	6.70E-05	2.29E-03	1.00E+00	2.24E+00	5.00E+00	2.29E-03	1.03E-03	4.59E-04
Endosulfan II	8.30E-01	1.00E+00	8.30E-01	8.86E-01	7.35E-01	1.00E+00	8.30E-01	1.30E-04	2.45E-02	1.00E+00	2.24E+00	5.00E+00	2.45E-02	1.10E-02	4.90E-03
Endrin	1.20E+00	1.00E+00	1.20E+00	5.35E-01	6.42E-01	1.00E+00	1.20E+00	1.30E-04	3.02E-02	1.84E-01	4.11E-01	9.20E-01	1.64E-01	7.34E-02	3.28E-02
gamma-Chlordane	7.80E-01	1.00E+00	7.80E-01	1.65E-01	1.29E-01	1.00E+00	7.80E-01	6.70E-05	1.61E-02	4.58E+00	6.48E+00	9.16E+00	3.51E-03	2.48E-03	1.75E-03
Heptachlor	6.90E-04	1.00E+00	6.90E-04	1.74E-01	1.20E-04	1.00E+00	6.90E-04	6.70E-05	2.39E-05	2.00E-01	4.47E-01	1.00E+00	1.20E-04	5.35E-05	2.39E-05
Heptachlor epoxide	5.40E-01	1.00E+00	5.40E-01	5.66E-01	3.05E-01	1.00E+00	5.40E-01	6.70E-05	1.38E-02	2.00E-01	4.47E-01	1.00E+00	6.90E-02	3.08E-02	1.38E-02
Methoxychlor	5.20E-01	1.00E+00	5.20E-01	5.25E-01	2.73E-01	1.00E+00	5.20E-01	6.70E-04	1.31E-02	4.00E+00	5.66E+00	8.00E+00	3.28E-03	2.32E-03	1.64E-03
Semivolatile Organics															
Acenaphthene	3.00E-01	2.04E+00	6.12E-01	1.55E+00	4.65E-01	1.00E+00	3.00E-01	6.90E-05	1.55E-02	3.50E+02	4.95E+02	7.00E+02	4.44E-05	3.14E-05	2.22E-05
Acenaphthylene	1.20E-01	2.04E+00	2.45E-01	1.31E+00	1.57E-01	1.00E+00	1.20E-01	2.00E-04	5.88E-03	3.50E+02	4.95E+02	7.00E+02	1.68E-05	1.19E-05	8.40E-06
Anthracene	2.60E-01	2.71E-01	7.05E-02	8.61E-01	2.24E-01	1.00E+00	2.60E-01	2.00E-04	5.06E-03	1.00E+03	2.24E+03	5.00E+03	5.06E-06	2.26E-06	1.01E-06
Benzo(a)anthracene	1.50E+00	1.40E+00	2.10E+00	2.94E-01	4.41E-01	1.00E+00	1.50E+00	3.40E-04	4.14E-02	2.00E+00	4.47E+00	1.00E+01	2.07E-02	9.25E-03	4.14E-03
Benzo(a)pyrene	2.10E+00	1.91E-01	4.01E-01	2.01E-01	4.21E-01	1.00E+00	2.10E+00	2.40E-04	2.13E-02	2.00E+00	4.47E+00	1.00E+01	1.06E-02	4.76E-03	2.13E-03
Benzo(b)fluoranthene	3.90E+00	1.60E-01	6.24E-01	3.10E-01	1.21E+00	1.00E+00	3.90E+00	5.80E-04	4.32E-02	2.00E+00	4.47E+00	1.00E+01	2.16E-02	9.66E-03	4.32E-03
Benzo(g,h,i)perylene	1.90E+00	2.95E-01	5.61E-01	1.16E-01	2.20E-01	1.00E+00	1.90E+00	1.60E-04	1.99E-02	2.00E+00	4.47E+00	1.00E+01	9.96E-03	4.45E-03	1.99E-03
Benzo(k)fluoranthene	1.60E+00	4.21E-01	6.74E-01	1.84E-01	2.95E-01	1.00E+00	1.60E+00	1.50E-04	2.08E-02	2.00E+00	4.47E+00	1.00E+01	1.04E-02	4.66E-03	2.08E-03
Chrysene	2.70E+00	3.35E-01	9.05E-01	2.94E-01	7.94E-01	1.00E+00	2.70E+00	8.00E-05	3.57E-02	2.00E+00	4.47E+00	1.00E+01	1.78E-02	7.98E-03	3.57E-03
Dibenz(a,h)anthracene	6.60E-01	2.71E-01	1.79E-01	1.30E-01	8.58E-02	1.00E+00	6.60E-01	2.00E-04	6.84E-03	2.00E+00	4.47E+00	1.00E+01	3.42E-03	1.53E-03	6.84E-04
Fluoranthene	1.80E+00	3.12E-01	5.62E-01	5.00E-01	9.00E-01	1.00E+00	1.80E+00	3.20E-04	2.79E-02	5.00E+02	1.12E+03	2.50E+03	5.57E-05	2.49E-05	1.11E-05

TABLE B-4-1
Summary of Raccoon Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Fluorene	4.20E-01	1.13E+00	4.75E-01	1.18E+00	4.97E-01	1.00E+00	4.20E-01	2.00E-04	1.47E-02	5.00E+02	1.12E+03	2.50E+03	2.94E-05	1.31E-05	5.88E-06
Indeno(1,2,3-cd)pyrene	2.80E+00	3.55E-01	9.94E-01	1.10E-01	3.08E-01	1.00E+00	2.80E+00	2.40E-04	3.14E-02	2.00E+00	4.47E+00	1.00E+01	1.57E-02	7.02E-03	3.14E-03
Pentachlorophenol	1.10E-01	1.00E+00	1.10E-01	5.93E+00	6.52E-01	1.00E+00	1.10E-01	9.80E-04	1.02E-02	5.00E+00	1.12E+01	2.50E+01	2.05E-03	9.16E-04	4.10E-04
Phenanthrene	4.20E-01	6.52E-01	2.74E-01	8.61E-01	3.62E-01	1.00E+00	4.20E-01	8.80E-05	1.03E-02	5.00E+02	1.12E+03	2.50E+03	2.06E-05	9.21E-06	4.12E-06
Pyrene	3.80E+00	8.03E-01	3.05E+00	7.20E-01	2.74E+00	1.00E+00	3.80E+00	2.90E-04	9.42E-02	2.00E+00	4.47E+00	1.00E+01	4.71E-02	2.11E-02	9.42E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1307 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.436 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.400 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.094 = Proportion of diet composed of sediment
WIR = 0.6092 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 4.23 = Body weight (kg)

TABLE B-4-2
Summary of Mink Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.36E+01	6.90E-01	3.01E+01	1.10E+00	4.81E+01	1.26E-01	5.49E+00	5.80E-02	2.67E-01	1.20E+00	2.68E+00	6.00E+00	2.22E-01	9.94E-02	4.44E-02
Cadmium	5.70E+00	3.07E+00	1.75E+01	3.25E+00	1.85E+01	1.64E-01	9.35E-01	8.20E-04	4.50E-02	7.50E-01	1.68E+00	3.75E+00	6.00E-02	2.68E-02	1.20E-02
Chromium	4.97E+01	4.68E-01	2.33E+01	8.39E-02	4.17E+00	3.80E-02	1.89E+00	6.30E-03	9.11E-02	3.28E+00	7.33E+00	1.64E+01	2.78E-02	1.24E-02	5.56E-03
Copper	1.42E+02	7.96E+00	1.13E+03	6.25E-01	8.88E+01	1.00E-01	1.42E+01	2.59E-02	6.84E-01	1.17E+01	1.33E+01	1.51E+01	5.85E-02	5.14E-02	4.52E-02
Lead	4.17E+02	3.26E-01	1.36E+02	4.68E-01	1.95E+02	7.00E-02	2.92E+01	5.90E-03	1.40E+00	8.00E+00	2.53E+01	8.00E+01	1.76E-01	5.55E-02	1.76E-02
Mercury	6.20E-01	2.87E+00	1.78E+00	5.00E+00	3.10E+00	4.58E+00	2.84E+00	2.00E-04	1.37E-01	1.50E-01	1.94E-01	2.50E-01	9.11E-01	7.06E-01	5.47E-01
Nickel	2.36E+01	2.14E-01	5.05E+00	1.41E+00	3.33E+01	1.00E+00	2.36E+01	3.50E-03	1.14E+00	2.50E+01	3.95E+01	6.25E+01	4.54E-02	2.87E-02	1.82E-02
Selenium	1.40E+00	1.00E+00	1.40E+00	3.01E+00	4.22E+00	1.00E+00	1.40E+00	1.30E-03	6.74E-02	2.00E-01	2.57E-01	3.30E-01	3.37E-01	2.62E-01	2.04E-01
Silver	6.10E+00	1.80E-01	1.10E+00	3.67E-02	2.24E-01	1.00E+00	6.10E+00	7.00E-05	2.94E-01	9.06E+00	2.03E+01	4.53E+01	3.24E-02	1.45E-02	6.48E-03
Zinc	4.75E+02	4.76E+00	2.26E+03	1.82E+00	8.65E+02	1.47E-01	6.98E+01	6.54E-02	3.36E+00	2.08E+01	4.65E+01	1.04E+02	1.62E-01	7.23E-02	3.23E-02
Polychlorinated Biphenyls															
Aroclor-1248	1.90E-02	2.19E+01	4.16E-01	1.84E-01	3.50E-03	1.29E+01	2.46E-01	9.30E-04	1.19E-02	1.40E-01	3.11E-01	6.90E-01	8.48E-02	3.82E-02	1.72E-02
Aroclor-1254	2.10E+01	2.19E+01	4.60E+02	1.39E-01	2.93E+00	1.29E+01	2.72E+02	6.70E-04	1.31E+01	1.40E-01	3.11E-01	6.90E-01	**9.34E+01**	**4.21E+01**	**1.90E+01**
Aroclor-1260	1.20E+00	2.19E+01	2.63E+01	1.05E-01	1.26E-01	1.29E+01	1.55E+01	8.00E-04	7.47E-01	1.40E-01	3.11E-01	6.90E-01	**5.34E+00**	**2.40E+00**	**1.08E+00**
Pesticides															
4,4'-DDD	3.80E-01	3.50E-01	1.33E-01	2.02E-01	7.69E-02	2.25E+00	8.55E-01	1.30E-04	4.11E-02	1.00E+00	2.24E+00	5.00E+00	4.11E-02	1.84E-02	8.23E-03
4,4'-DDE	6.00E-01	3.36E+00	2.02E+00	1.09E-01	6.56E-02	2.62E+01	1.57E+01	1.30E-04	7.56E-01	1.00E+00	2.24E+00	5.00E+00	7.56E-01	3.38E-01	1.51E-01
4,4'-DDT	1.60E+00	2.28E+00	3.65E+00	1.35E-01	2.17E-01	8.80E+00	1.41E+01	1.30E-04	6.78E-01	1.00E+00	2.24E+00	5.00E+00	6.78E-01	3.03E-01	1.36E-01
Aldrin	8.50E-04	1.00E+00	8.50E-04	1.39E-01	1.18E-04	1.00E+00	8.50E-04	6.70E-05	4.35E-05	2.00E-01	4.47E-01	1.00E+00	2.18E-04	9.74E-05	4.35E-05
alpha-Chlordane	1.70E-02	1.00E+00	1.70E-02	1.65E-01	2.80E-03	1.00E+00	1.70E-02	6.70E-05	8.21E-04	4.58E+00	6.48E+00	9.16E+00	1.79E-04	1.27E-04	8.96E-05
Dieldrin	1.40E+00	4.92E+00	6.89E+00	4.00E-01	5.60E-01	1.00E+00	1.40E+00	1.30E-04	6.74E-02	2.80E-02	6.26E-02	1.40E-01	**2.41E+00**	**1.08E+00**	4.81E-01
Endosulfan I	5.80E-02	1.00E+00	5.80E-02	1.69E+00	9.79E-02	1.00E+00	5.80E-02	6.70E-05	2.79E-03	1.00E+00	2.24E+00	5.00E+00	2.79E-03	1.25E-03	5.59E-04
Endosulfan II	8.30E-01	1.00E+00	8.30E-01	8.86E-01	7.35E-01	1.00E+00	8.30E-01	1.30E-04	3.99E-02	1.00E+00	2.24E+00	5.00E+00	3.99E-02	1.79E-02	7.99E-03
Endrin	1.20E+00	1.00E+00	1.20E+00	5.35E-01	6.42E-01	1.00E+00	1.20E+00	1.30E-04	5.77E-02	1.84E-01	4.11E-01	9.20E-01	3.14E-01	1.40E-01	6.28E-02
gamma-Chlordane	7.80E-01	1.00E+00	7.80E-01	1.65E-01	1.29E-01	1.00E+00	7.80E-01	6.70E-05	3.75E-02	4.58E+00	6.48E+00	9.16E+00	8.20E-03	5.80E-03	4.10E-03
Heptachlor	6.90E-04	1.00E+00	6.90E-04	1.74E-01	1.20E-04	1.00E+00	6.90E-04	6.70E-05	3.58E-05	2.00E-01	4.47E-01	1.00E+00	1.79E-04	8.01E-05	3.58E-05
Heptachlor epoxide	5.40E-01	1.00E+00	5.40E-01	5.66E-01	3.05E-01	1.00E+00	5.40E-01	6.70E-05	2.60E-02	2.00E-01	4.47E-01	1.00E+00	1.30E-01	5.81E-02	2.60E-02
Methoxychlor	5.20E-01	1.00E+00	5.20E-01	5.25E-01	2.73E-01	1.00E+00	5.20E-01	6.70E-04	2.50E-02	4.00E+00	5.66E+00	8.00E+00	6.26E-03	4.43E-03	3.13E-03
Semivolatile Organics															
Acenaphthene	3.00E-01	2.04E+00	6.12E-01	1.55E+00	4.65E-01	1.00E+00	3.00E-01	6.90E-05	1.44E-02	3.50E+02	4.95E+02	7.00E+02	4.13E-05	2.92E-05	2.06E-05
Acenaphthylene	1.20E-01	2.04E+00	2.45E-01	1.31E+00	1.57E-01	1.00E+00	1.20E-01	2.00E-04	5.78E-03	3.50E+02	4.95E+02	7.00E+02	1.65E-05	1.17E-05	8.26E-06
Anthracene	2.60E-01	2.71E-01	7.05E-02	8.61E-01	2.24E-01	1.00E+00	2.60E-01	2.00E-04	1.25E-02	1.00E+03	2.24E+03	5.00E+03	1.25E-05	5.60E-06	2.50E-06
Benzo(a)anthracene	1.50E+00	1.40E+00	2.10E+00	2.94E-01	4.41E-01	1.00E+00	1.50E+00	3.40E-04	7.22E-02	2.00E+00	4.47E+00	1.00E+01	3.61E-02	1.61E-02	7.22E-03
Benzo(a)pyrene	2.10E+00	1.91E-01	4.01E-01	2.01E-01	4.21E-01	1.00E+00	2.10E+00	2.40E-04	1.01E-01	2.00E+00	4.47E+00	1.00E+01	5.05E-02	2.26E-02	1.01E-02
Benzo(b)fluoranthene	3.90E+00	1.60E-01	6.24E-01	3.10E-01	1.21E+00	1.00E+00	3.90E+00	5.80E-04	1.88E-01	2.00E+00	4.47E+00	1.00E+01	9.38E-02	4.20E-02	1.88E-02
Benzo(g,h,i)perylene	1.90E+00	2.95E-01	5.61E-01	1.16E-01	2.20E-01	1.00E+00	1.90E+00	1.60E-04	9.14E-02	2.00E+00	4.47E+00	1.00E+01	4.57E-02	2.04E-02	9.14E-03
Benzo(k)fluoranthene	1.60E+00	4.21E-01	6.74E-01	1.84E-01	2.95E-01	1.00E+00	1.60E+00	1.50E-04	7.70E-02	2.00E+00	4.47E+00	1.00E+01	3.85E-02	1.72E-02	7.70E-03
Chrysene	2.70E+00	3.35E-01	9.05E-01	2.94E-01	7.94E-01	1.00E+00	2.70E+00	8.00E-05	1.30E-01	2.00E+00	4.47E+00	1.00E+01	6.50E-02	2.91E-02	1.30E-02
Dibenz(a,h)anthracene	6.60E-01	2.71E-01	1.79E-01	1.30E-01	8.58E-02	1.00E+00	6.60E-01	2.00E-04	3.18E-02	2.00E+00	4.47E+00	1.00E+01	1.59E-02	7.10E-03	3.18E-03
Fluoranthene	1.80E+00	3.12E-01	5.62E-01	5.00E-01	9.00E-01	1.00E+00	1.80E+00	3.20E-04	8.66E-02	5.00E+02	1.12E+03	2.50E+03	1.73E-04	7.75E-05	3.47E-05

TABLE B-4-2
Summary of Mink Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Fluorene	4.20E-01	1.13E+00	4.75E-01	1.18E+00	4.97E-01	1.00E+00	4.20E-01	2.00E-04	2.02E-02	5.00E+02	1.12E+03	2.50E+03	4.04E-05	1.81E-05	8.09E-06
Indeno(1,2,3-cd)pyrene	2.80E+00	3.55E-01	9.94E-01	1.10E-01	3.08E-01	1.00E+00	2.80E+00	2.40E-04	1.35E-01	2.00E+00	4.47E+00	1.00E+01	6.74E-02	3.01E-02	1.35E-02
Pentachlorophenol	1.10E-01	1.00E+00	1.10E-01	5.93E+00	6.52E-01	1.00E+00	1.10E-01	9.80E-04	5.33E-03	5.00E+00	1.12E+01	2.50E+01	1.07E-03	4.77E-04	2.13E-04
Phenanthrene	4.20E-01	6.52E-01	2.74E-01	8.61E-01	3.62E-01	1.00E+00	4.20E-01	8.80E-05	2.02E-02	5.00E+02	1.12E+03	2.50E+03	4.04E-05	1.81E-05	8.09E-06
Pyrene	3.80E+00	8.03E-01	3.05E+00	7.20E-01	2.74E+00	1.00E+00	3.80E+00	2.90E-04	1.83E-01	2.00E+00	4.47E+00	1.00E+01	9.14E-02	4.09E-02	1.83E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0349 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of sediment
WIR = 0.0286 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.726 = Body weight (kg)

TABLE B-4-3
Summary of Muskrat Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.36E+01	6.90E-01	3.01E+01	1.10E+00	4.81E+01	1.26E-01	5.49E+00	5.80E-02	4.87E+00	2.52E-01	5.63E-01	1.26E+00	**1.93E+01**	**8.65E+00**	**3.87E+00**
Cadmium	5.70E+00	3.07E+00	1.75E+01	3.25E+00	1.85E+01	1.64E-01	9.35E-01	8.20E-04	1.77E+00	1.00E+00	3.16E+00	1.00E+01	**1.77E+00**	5.59E-01	1.77E-01
Chromium	4.97E+01	4.68E-01	2.33E+01	8.39E-02	4.17E+00	3.80E-02	1.89E+00	6.30E-03	8.63E-01	3.28E+00	7.33E+00	1.64E+01	2.63E-01	1.18E-01	5.26E-02
Copper	1.42E+02	7.96E+00	1.13E+03	6.25E-01	8.88E+01	1.00E-01	1.42E+01	2.59E-02	9.57E+00	7.80E+01	9.01E+01	1.04E+02	1.23E-01	1.06E-01	9.20E-02
Lead	4.17E+02	3.26E-01	1.36E+02	4.68E-01	1.95E+02	7.00E-02	2.92E+01	5.90E-03	2.20E+01	8.00E+00	2.53E+01	8.00E+01	**2.75E+00**	8.71E-01	2.75E-01
Mercury	6.20E-01	2.87E+00	1.78E+00	5.00E+00	3.10E+00	4.58E+00	2.84E+00	2.00E-04	2.92E-01	3.20E-02	7.16E-02	1.60E-01	**9.14E+00**	**4.09E+00**	**1.83E+00**
Nickel	2.36E+01	2.14E-01	5.05E+00	1.41E+00	3.33E+01	1.00E+00	2.36E+01	3.50E-03	3.30E+00	4.00E+01	5.66E+01	8.00E+01	8.26E-02	5.84E-02	4.13E-02
Selenium	1.40E+00	1.00E+00	1.40E+00	3.01E+00	4.22E+00	1.00E+00	1.40E+00	1.30E-03	4.03E-01	2.00E-01	2.57E-01	3.30E-01	**2.02E+00**	**1.57E+00**	**1.22E+00**
Silver	6.10E+00	1.80E-01	1.10E+00	3.67E-02	2.24E-01	1.00E+00	6.10E+00	7.00E-05	7.92E-02	9.06E+00	2.03E+01	4.53E+01	8.74E-03	3.91E-03	1.75E-03
Zinc	4.75E+02	4.76E+00	2.26E+03	1.82E+00	8.65E+02	1.47E-01	6.98E+01	6.54E-02	8.45E+01	1.60E+02	2.26E+02	3.20E+02	5.28E-01	3.73E-01	2.64E-01
Polychlorinated Biphenyls															
Aroclor-1248	1.90E-02	2.19E+01	4.16E-01	1.84E-01	3.50E-03	1.29E+01	2.46E-01	9.30E-04	6.83E-04	1.36E-01	3.04E-01	6.80E-01	5.02E-03	2.24E-03	1.00E-03
Aroclor-1254	2.10E+01	2.19E+01	4.60E+02	1.39E-01	2.93E+00	1.29E+01	2.72E+02	6.70E-04	4.72E-01	1.36E-01	3.04E-01	6.80E-01	**3.47E+00**	**1.55E+00**	6.94E-01
Aroclor-1260	1.20E+00	2.19E+01	2.63E+01	1.05E-01	1.26E-01	1.29E+01	1.55E+01	8.00E-04	2.33E-02	1.36E-01	3.04E-01	6.80E-01	1.72E-01	7.67E-02	3.43E-02
Pesticides															
4,4'-DDD	3.80E-01	3.50E-01	1.33E-01	2.02E-01	7.69E-02	2.25E+00	8.55E-01	1.30E-04	1.08E-02	8.00E-01	1.79E+00	4.00E+00	1.35E-02	6.02E-03	2.69E-03
4,4'-DDE	6.00E-01	3.36E+00	2.02E+00	1.09E-01	6.56E-02	2.62E+01	1.57E+01	1.30E-04	1.18E-02	8.00E-01	1.79E+00	4.00E+00	1.48E-02	6.62E-03	2.96E-03
4,4'-DDT	1.60E+00	2.28E+00	3.65E+00	1.35E-01	2.17E-01	8.80E+00	1.41E+01	1.30E-04	3.54E-02	8.00E-01	1.79E+00	4.00E+00	4.42E-02	1.98E-02	8.85E-03
Aldrin	8.50E-04	1.00E+00	8.50E-04	1.39E-01	1.18E-04	1.00E+00	8.50E-04	6.70E-05	3.18E-05	2.00E-01	4.47E-01	1.00E+00	1.59E-04	7.12E-05	3.18E-05
alpha-Chlordane	1.70E-02	1.00E+00	1.70E-02	1.65E-01	2.80E-03	1.00E+00	1.70E-02	6.70E-05	4.35E-04	4.58E+00	6.48E+00	9.16E+00	9.49E-05	6.71E-05	4.75E-05
Dieldrin	1.40E+00	4.92E+00	6.89E+00	4.00E-01	5.60E-01	1.00E+00	1.40E+00	1.30E-04	6.52E-02	4.00E-02	8.94E-02	2.00E-01	**1.63E+00**	7.29E-01	3.26E-01
Endosulfan I	5.80E-02	1.00E+00	5.80E-02	1.69E+00	9.79E-02	1.00E+00	5.80E-02	6.70E-05	9.61E-03	1.50E-01	3.35E-01	7.50E-01	6.41E-02	2.87E-02	1.28E-02
Endosulfan II	8.30E-01	1.00E+00	8.30E-01	8.86E-01	7.35E-01	1.00E+00	8.30E-01	1.30E-04	7.59E-02	1.50E-01	3.35E-01	7.50E-01	5.06E-01	2.26E-01	1.01E-01
Endrin	1.20E+00	1.00E+00	1.20E+00	5.35E-01	6.42E-01	1.00E+00	1.20E+00	1.30E-04	7.08E-02	1.84E-01	4.11E-01	9.20E-01	3.85E-01	1.72E-01	7.70E-02
gamma-Chlordane	7.80E-01	1.00E+00	7.80E-01	1.65E-01	1.29E-01	1.00E+00	7.80E-01	6.70E-05	1.94E-02	4.58E+00	6.48E+00	9.16E+00	4.23E-03	2.99E-03	2.11E-03
Heptachlor	6.90E-04	1.00E+00	6.90E-04	1.74E-01	1.20E-04	1.00E+00	6.90E-04	6.70E-05	3.05E-05	2.00E-01	4.47E-01	1.00E+00	1.52E-04	6.81E-05	3.05E-05
Heptachlor epoxide	5.40E-01	1.00E+00	5.40E-01	5.66E-01	3.05E-01	1.00E+00	5.40E-01	6.70E-05	3.34E-02	2.00E-01	4.47E-01	1.00E+00	1.67E-01	7.47E-02	3.34E-02
Methoxychlor	5.20E-01	1.00E+00	5.20E-01	5.25E-01	2.73E-01	1.00E+00	5.20E-01	6.70E-04	3.03E-02	4.00E+00	5.66E+00	8.00E+00	7.58E-03	5.36E-03	3.79E-03
Semivolatile Organics															
Acenaphthene	3.00E-01	2.04E+00	6.12E-01	1.55E+00	4.65E-01	1.00E+00	3.00E-01	6.90E-05	4.59E-02	3.50E+02	4.95E+02	7.00E+02	1.31E-04	9.27E-05	6.56E-05
Acenaphthylene	1.20E-01	2.04E+00	2.45E-01	1.31E+00	1.57E-01	1.00E+00	1.20E-01	2.00E-04	1.57E-02	3.50E+02	4.95E+02	7.00E+02	4.49E-05	3.18E-05	2.25E-05
Anthracene	2.60E-01	2.71E-01	7.05E-02	8.61E-01	2.24E-01	1.00E+00	2.60E-01	2.00E-04	2.32E-02	1.00E+03	2.24E+03	5.00E+03	2.32E-05	1.04E-05	4.64E-06
Benzo(a)anthracene	1.50E+00	1.40E+00	2.10E+00	2.94E-01	4.41E-01	1.00E+00	1.50E+00	3.40E-04	5.52E-02	2.00E+00	4.47E+00	1.00E+01	2.76E-02	1.23E-02	5.52E-03
Benzo(a)pyrene	2.10E+00	1.91E-01	4.01E-01	2.01E-01	4.21E-01	1.00E+00	2.10E+00	2.40E-04	5.91E-02	2.00E+00	4.47E+00	1.00E+01	2.95E-02	1.32E-02	5.91E-03
Benzo(b)fluoranthene	3.90E+00	1.60E-01	6.24E-01	3.10E-01	1.21E+00	1.00E+00	3.90E+00	5.80E-04	1.49E-01	2.00E+00	4.47E+00	1.00E+01	7.46E-02	3.34E-02	1.49E-02
Benzo(g,h,i)perylene	1.90E+00	2.95E-01	5.61E-01	1.16E-01	2.20E-01	1.00E+00	1.90E+00	1.60E-04	3.85E-02	2.00E+00	4.47E+00	1.00E+01	1.93E-02	8.62E-03	3.85E-03
Benzo(k)fluoranthene	1.60E+00	4.21E-01	6.74E-01	1.84E-01	2.95E-01	1.00E+00	1.60E+00	1.50E-04	4.26E-02	2.00E+00	4.47E+00	1.00E+01	2.13E-02	9.53E-03	4.26E-03
Chrysene	2.70E+00	3.35E-01	9.05E-01	2.94E-01	7.94E-01	1.00E+00	2.70E+00	8.00E-05	9.93E-02	2.00E+00	4.47E+00	1.00E+01	4.96E-02	2.22E-02	9.93E-03
Dibenz(a,h)anthracene	6.60E-01	2.71E-01	1.79E-01	1.30E-01	8.58E-02	1.00E+00	6.60E-01	2.00E-04	1.43E-02	2.00E+00	4.47E+00	1.00E+01	7.15E-03	3.20E-03	1.43E-03
Fluoranthene	1.80E+00	3.12E-01	5.62E-01	5.00E-01	9.00E-01	1.00E+00	1.80E+00	3.20E-04	1.00E-01	5.00E+02	1.12E+03	2.50E+03	2.01E-04	8.99E-05	4.02E-05

TABLE B-4-3
Summary of Muskrat Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Fluorene	4.20E-01	1.13E+00	4.75E-01	1.18E+00	4.97E-01	1.00E+00	4.20E-01	2.00E-04	5.00E-02	5.00E+02	1.12E+03	2.50E+03	1.00E-04	4.47E-05	2.00E-05
Indeno(1,2,3-cd)pyrene	2.80E+00	3.55E-01	9.94E-01	1.10E-01	3.08E-01	1.00E+00	2.80E+00	2.40E-04	5.54E-02	2.00E+00	4.47E+00	1.00E+01	2.77E-02	1.24E-02	5.54E-03
Pentachlorophenol	1.10E-01	1.00E+00	1.10E-01	5.93E+00	6.52E-01	1.00E+00	1.10E-01	9.80E-04	6.15E-02	5.00E+00	1.12E+01	2.50E+01	1.23E-02	5.50E-03	2.46E-03
Phenanthrene	4.20E-01	6.52E-01	2.74E-01	8.61E-01	3.62E-01	1.00E+00	4.20E-01	8.80E-05	3.75E-02	5.00E+02	1.12E+03	2.50E+03	7.49E-05	3.35E-05	1.50E-05
Pyrene	3.80E+00	8.03E-01	3.05E+00	7.20E-01	2.74E+00	1.00E+00	3.80E+00	2.90E-04	2.89E-01	2.00E+00	4.47E+00	1.00E+01	1.45E-01	6.47E-02	2.89E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0765 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.906 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.094 = Proportion of diet composed of sediment
WIR = 0.1426 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.750 = Body weight (kg)

TABLE B-4-4
Summary of Marsh Wren Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.36E+01	6.90E-01	3.01E+01	1.10E+00	4.81E+01	1.26E-01	5.49E+00	5.80E-02	9.43E+00	2.46E+00	4.26E+00	7.38E+00	**3.83E+00**	**2.21E+00**	**1.28E+00**
Cadmium	5.70E+00	3.07E+00	1.75E+01	3.25E+00	1.85E+01	1.64E-01	9.35E-01	8.20E-04	5.18E+00	1.45E+00	5.39E+00	2.00E+01	**3.57E+00**	9.62E-01	2.59E-01
Chromium	4.97E+01	4.68E-01	2.33E+01	8.39E-02	4.17E+00	3.80E-02	1.89E+00	6.30E-03	7.52E+00	1.00E+00	2.24E+00	5.00E+00	**7.52E+00**	**3.36E+00**	**1.50E+00**
Copper	1.42E+02	7.96E+00	1.13E+03	6.25E-01	8.88E+01	1.00E-01	1.42E+01	2.59E-02	3.31E+02	4.70E+01	5.39E+01	6.17E+01	**7.03E+00**	**6.14E+00**	**5.36E+00**
Lead	4.17E+02	3.26E-01	1.36E+02	4.68E-01	1.95E+02	7.00E-02	2.92E+01	5.90E-03	4.59E+01	3.85E+00	8.61E+00	1.93E+01	**1.19E+01**	**5.33E+00**	**2.38E+00**
Mercury	6.20E-01	2.87E+00	1.78E+00	5.00E+00	3.10E+00	4.58E+00	2.84E+00	2.00E-04	5.26E-01	2.60E-02	4.50E-02	7.80E-02	**2.02E+01**	**1.17E+01**	**6.75E+00**
Nickel	2.36E+01	2.14E-01	5.05E+00	1.41E+00	3.33E+01	1.00E+00	2.36E+01	3.50E-03	1.83E+00	7.74E+01	9.10E+01	1.07E+02	2.36E-02	2.01E-02	1.71E-02
Selenium	1.40E+00	1.00E+00	1.40E+00	3.01E+00	4.22E+00	1.00E+00	1.40E+00	1.30E-03	4.29E-01	4.00E-01	5.66E-01	8.00E-01	**1.07E+00**	7.58E-01	5.36E-01
Silver	6.10E+00	1.80E-01	1.10E+00	3.67E-02	2.24E-01	1.00E+00	6.10E+00	7.00E-05	4.13E-01	3.56E+01	7.96E+01	1.78E+02	1.16E-02	5.18E-03	2.32E-03
Zinc	4.75E+02	4.76E+00	2.26E+03	1.82E+00	8.65E+02	1.47E-01	6.98E+01	6.54E-02	6.64E+02	1.45E+01	4.36E+01	1.31E+02	**4.58E+01**	**1.52E+01**	**5.07E+00**
Polychlorinated Biphenyls															
Aroclor-1248	1.90E-02	2.19E+01	4.16E-01	1.84E-01	3.50E-03	1.29E+01	2.46E-01	9.30E-04	1.21E-01	1.50E+00	3.35E+00	7.50E+00	8.10E-02	3.62E-02	1.62E-02
Aroclor-1254	2.10E+01	2.19E+01	4.60E+02	1.39E-01	2.93E+00	1.29E+01	2.72E+02	6.70E-04	1.34E+02	1.50E+00	3.35E+00	7.50E+00	**8.93E+01**	**3.99E+01**	**1.79E+01**
Aroclor-1260	1.20E+00	2.19E+01	2.63E+01	1.05E-01	1.26E-01	1.29E+01	1.55E+01	8.00E-04	7.65E+00	1.50E+00	3.35E+00	7.50E+00	**5.10E+00**	**2.28E+00**	**1.02E+00**
Pesticides															
4,4'-DDD	3.80E-01	3.50E-01	1.33E-01	2.02E-01	7.69E-02	2.25E+00	8.55E-01	1.30E-04	4.45E-02	1.20E-01	2.68E-01	6.00E-01	3.71E-01	1.66E-01	7.42E-02
4,4'-DDE	6.00E-01	3.36E+00	2.02E+00	1.09E-01	6.56E-02	2.62E+01	1.57E+01	1.30E-04	5.95E-01	1.20E-01	2.68E-01	6.00E-01	**4.96E+00**	**2.22E+00**	9.92E-01
4,4'-DDT	1.60E+00	2.28E+00	3.65E+00	1.35E-01	2.17E-01	8.80E+00	1.41E+01	1.30E-04	1.08E+00	6.00E-01	9.49E-01	1.50E+00	**1.81E+00**	**1.14E+00**	7.23E-01
Aldrin	8.50E-04	1.00E+00	8.50E-04	1.39E-01	1.18E-04	1.00E+00	8.50E-04	6.70E-05	2.83E-04	1.55E-01	3.47E-01	7.75E-01	1.82E-03	8.16E-04	3.65E-04
alpha-Chlordane	1.70E-02	1.00E+00	1.70E-02	1.65E-01	2.80E-03	1.00E+00	1.70E-02	6.70E-05	5.22E-03	2.14E+00	4.79E+00	1.07E+01	2.44E-03	1.09E-03	4.88E-04
Dieldrin	1.40E+00	4.92E+00	6.89E+00	4.00E-01	5.60E-01	1.00E+00	1.40E+00	1.30E-04	2.02E+00	7.70E-02	1.72E-01	3.85E-01	**2.63E+01**	**1.18E+01**	**5.26E+00**
Endosulfan I	5.80E-02	1.00E+00	5.80E-02	1.69E+00	9.79E-02	1.00E+00	5.80E-02	6.70E-05	1.78E-02	1.00E+01	2.24E+01	5.00E+01	1.78E-03	7.95E-04	3.55E-04
Endosulfan II	8.30E-01	1.00E+00	8.30E-01	8.86E-01	7.35E-01	1.00E+00	8.30E-01	1.30E-04	2.54E-01	1.00E+01	2.24E+01	5.00E+01	2.54E-02	1.14E-02	5.08E-03
Endrin	1.20E+00	1.00E+00	1.20E+00	5.35E-01	6.42E-01	1.00E+00	1.20E+00	1.30E-04	3.67E-01	3.00E-01	6.71E-01	1.50E+00	**1.22E+00**	5.47E-01	2.45E-01
gamma-Chlordane	7.80E-01	1.00E+00	7.80E-01	1.65E-01	1.29E-01	1.00E+00	7.80E-01	6.70E-05	2.39E-01	2.14E+00	4.79E+00	1.07E+01	1.12E-01	4.99E-02	2.23E-02
Heptachlor	6.90E-04	1.00E+00	6.90E-04	1.74E-01	1.20E-04	1.00E+00	6.90E-04	6.70E-05	2.34E-04	4.80E-01	1.07E+00	2.40E+00	4.87E-04	2.18E-04	9.74E-05
Heptachlor epoxide	5.40E-01	1.00E+00	5.40E-01	5.66E-01	3.05E-01	1.00E+00	5.40E-01	6.70E-05	1.65E-01	4.80E-01	1.07E+00	2.40E+00	3.44E-01	1.54E-01	6.89E-02
Methoxychlor	5.20E-01	1.00E+00	5.20E-01	5.25E-01	2.73E-01	1.00E+00	5.20E-01	6.70E-04	1.59E-01	3.55E+02	7.94E+02	1.78E+03	4.49E-04	2.01E-04	8.98E-05
Semivolatile Organics															
Acenaphthene	3.00E-01	2.04E+00	6.12E-01	1.55E+00	4.65E-01	1.00E+00	3.00E-01	6.90E-05	1.83E-01	7.10E+00	1.59E+01	3.55E+01	2.57E-02	1.15E-02	5.14E-03
Acenaphthylene	1.20E-01	2.04E+00	2.45E-01	1.31E+00	1.57E-01	1.00E+00	1.20E-01	2.00E-04	7.31E-02	7.10E+00	1.59E+01	3.55E+01	1.03E-02	4.60E-03	2.06E-03
Anthracene	2.60E-01	2.71E-01	7.05E-02	8.61E-01	2.24E-01	1.00E+00	2.60E-01	2.00E-04	2.45E-02	7.10E+00	1.59E+01	3.55E+01	3.45E-03	1.54E-03	6.91E-04
Benzo(a)anthracene	1.50E+00	1.40E+00	2.10E+00	2.94E-01	4.41E-01	1.00E+00	1.50E+00	3.40E-04	6.34E-01	7.10E+00	1.59E+01	3.55E+01	8.92E-02	3.99E-02	1.78E-02
Benzo(a)pyrene	2.10E+00	1.91E-01	4.01E-01	2.01E-01	4.21E-01	1.00E+00	2.10E+00	2.40E-04	1.49E-01	7.10E+00	1.59E+01	3.55E+01	2.10E-02	9.37E-03	4.19E-03
Benzo(b)fluoranthene	3.90E+00	1.60E-01	6.24E-01	3.10E-01	1.21E+00	1.00E+00	3.90E+00	5.80E-04	2.41E-01	7.10E+00	1.59E+01	3.55E+01	3.40E-02	1.52E-02	6.80E-03
Benzo(g,h,i)perylene	1.90E+00	2.95E-01	5.61E-01	1.16E-01	2.20E-01	1.00E+00	1.90E+00	1.60E-04	1.92E-01	7.10E+00	1.59E+01	3.55E+01	2.71E-02	1.21E-02	5.41E-03
Benzo(k)fluoranthene	1.60E+00	4.21E-01	6.74E-01	1.84E-01	2.95E-01	1.00E+00	1.60E+00	1.50E-04	2.20E-01	7.10E+00	1.59E+01	3.55E+01	3.10E-02	1.39E-02	6.21E-03
Chrysene	2.70E+00	3.35E-01	9.05E-01	2.94E-01	7.94E-01	1.00E+00	2.70E+00	8.00E-05	3.04E-01	7.10E+00	1.59E+01	3.55E+01	4.29E-02	1.92E-02	8.57E-03
Dibenz(a,h)anthracene	6.60E-01	2.71E-01	1.79E-01	1.30E-01	8.58E-02	1.00E+00	6.60E-01	2.00E-04	6.22E-02	7.10E+00	1.59E+01	3.55E+01	8.75E-03	3.92E-03	1.75E-03
Fluoranthene	1.80E+00	3.12E-01	5.62E-01	5.00E-01	9.00E-01	1.00E+00	1.80E+00	3.20E-04	1.91E-01	7.10E+00	1.59E+01	3.55E+01	2.69E-02	1.20E-02	5.38E-03

TABLE B-4-4
Summary of Marsh Wren Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Fluorene	4.20E-01	1.13E+00	4.75E-01	1.18E+00	4.97E-01	1.00E+00	4.20E-01	2.00E-04	1.44E-01	7.10E+00	1.59E+01	3.55E+01	2.03E-02	9.10E-03	4.07E-03
Indeno(1,2,3-cd)pyrene	2.80E+00	3.55E-01	9.94E-01	1.10E-01	3.08E-01	1.00E+00	2.80E+00	2.40E-04	3.32E-01	7.10E+00	1.59E+01	3.55E+01	4.67E-02	2.09E-02	9.35E-03
Pentachlorophenol	1.10E-01	1.00E+00	1.10E-01	5.93E+00	6.52E-01	1.00E+00	1.10E-01	9.80E-04	3.40E-02	4.26E+00	6.02E+00	8.52E+00	7.98E-03	5.64E-03	3.99E-03
Phenanthrene	4.20E-01	6.52E-01	2.74E-01	8.61E-01	3.62E-01	1.00E+00	4.20E-01	8.80E-05	8.61E-02	7.10E+00	1.59E+01	3.55E+01	1.21E-02	5.42E-03	2.42E-03
Pyrene	3.80E+00	8.03E-01	3.05E+00	7.20E-01	2.74E+00	1.00E+00	3.80E+00	2.90E-04	9.45E-01	7.10E+00	1.59E+01	3.55E+01	1.33E-01	5.95E-02	2.66E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0030 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.950 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.050 = Proportion of diet composed of sediment
WIR = 0.0033 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0098 = Body weight (kg)

TABLE B-4-5
Summary of Belted Kingfisher Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.36E+01	6.90E-01	3.01E+01	1.10E+00	4.81E+01	1.26E-01	5.49E+00	5.80E-02	1.98E+00	5.14E+00	8.12E+00	1.28E+01	3.86E-01	2.44E-01	1.55E-01
Cadmium	5.70E+00	3.07E+00	1.75E+01	3.25E+00	1.85E+01	1.64E-01	9.35E-01	8.20E-04	7.52E-01	1.45E+00	5.39E+00	2.00E+01	5.18E-01	1.40E-01	3.76E-02
Chromium	4.97E+01	4.68E-01	2.33E+01	8.39E-02	4.17E+00	3.80E-02	1.89E+00	6.30E-03	1.11E+00	1.00E+00	2.24E+00	5.00E+00	**1.11E+00**	4.98E-01	2.23E-01
Copper	1.42E+02	7.96E+00	1.13E+03	6.25E-01	8.88E+01	1.00E-01	1.42E+01	2.59E-02	4.04E+01	4.70E+01	5.39E+01	6.17E+01	8.59E-01	7.50E-01	6.54E-01
Lead	4.17E+02	3.26E-01	1.36E+02	4.68E-01	1.95E+02	7.00E-02	2.92E+01	5.90E-03	9.69E+00	3.85E+00	8.61E+00	1.93E+01	**2.52E+00**	**1.13E+00**	5.04E-01
Mercury	6.20E-01	2.87E+00	1.78E+00	5.00E+00	3.10E+00	4.58E+00	2.84E+00	2.00E-04	5.59E-01	2.60E-02	4.50E-02	7.80E-02	**2.15E+01**	**1.24E+01**	**7.17E+00**
Nickel	2.36E+01	2.14E-01	5.05E+00	1.41E+00	3.33E+01	1.00E+00	2.36E+01	3.50E-03	4.32E+00	7.74E+01	9.10E+01	1.07E+02	5.59E-02	4.75E-02	4.04E-02
Selenium	1.40E+00	1.00E+00	1.40E+00	3.01E+00	4.22E+00	1.00E+00	1.40E+00	1.30E-03	2.94E-01	1.80E+00	4.02E+00	9.00E+00	1.63E-01	7.29E-02	3.26E-02
Silver	6.10E+00	1.80E-01	1.10E+00	3.67E-02	2.24E-01	1.00E+00	6.10E+00	7.00E-05	1.11E+00	3.56E+01	7.96E+01	1.78E+02	3.12E-02	1.39E-02	6.24E-03
Zinc	4.75E+02	4.76E+00	2.26E+03	1.82E+00	8.65E+02	1.47E-01	6.98E+01	6.54E-02	8.81E+01	1.45E+01	4.36E+01	1.31E+02	**6.07E+00**	**2.02E+00**	6.72E-01
Polychlorinated Biphenyls															
Aroclor-1248	1.90E-02	2.19E+01	4.16E-01	1.84E-01	3.50E-03	1.29E+01	2.46E-01	9.30E-04	5.74E-02	1.50E+00	3.35E+00	7.50E+00	3.82E-02	1.71E-02	7.65E-03
Aroclor-1254	2.10E+01	2.19E+01	4.60E+02	1.39E-01	2.93E+00	1.29E+01	2.72E+02	6.70E-04	6.32E+01	1.50E+00	3.35E+00	7.50E+00	**4.22E+01**	**1.89E+01**	**8.43E+00**
Aroclor-1260	1.20E+00	2.19E+01	2.63E+01	1.05E-01	1.26E-01	1.29E+01	1.55E+01	8.00E-04	3.61E+00	1.50E+00	3.35E+00	7.50E+00	**2.41E+00**	**1.08E+00**	4.82E-01
Pesticides															
4,4'-DDD	3.80E-01	3.50E-01	1.33E-01	2.02E-01	7.69E-02	2.25E+00	8.55E-01	1.30E-04	1.55E-01	3.00E-01	9.49E-01	3.00E+00	5.16E-01	1.63E-01	5.16E-02
4,4'-DDE	6.00E-01	3.36E+00	2.02E+00	1.09E-01	6.56E-02	2.62E+01	1.57E+01	1.30E-04	2.83E+00	3.00E-01	9.49E-01	3.00E+00	**9.45E+00**	**2.99E+00**	9.45E-01
4,4'-DDT	1.60E+00	2.28E+00	3.65E+00	1.35E-01	2.17E-01	8.80E+00	1.41E+01	1.30E-04	2.60E+00	3.00E-01	9.49E-01	3.00E+00	**8.67E+00**	**2.74E+00**	8.67E-01
Aldrin	8.50E-04	1.00E+00	8.50E-04	1.39E-01	1.18E-04	1.00E+00	8.50E-04	6.70E-05	1.89E-04	1.55E-01	3.47E-01	7.75E-01	1.22E-03	5.46E-04	2.44E-04
alpha-Chlordane	1.70E-02	1.00E+00	1.70E-02	1.65E-01	2.80E-03	1.00E+00	1.70E-02	6.70E-05	3.57E-03	8.00E-01	1.79E+00	4.00E+00	4.47E-03	2.00E-03	8.93E-04
Dieldrin	1.40E+00	4.92E+00	6.89E+00	4.00E-01	5.60E-01	1.00E+00	1.40E+00	1.30E-04	4.77E-01	7.70E-02	1.72E-01	3.85E-01	**6.20E+00**	**2.77E+00**	**1.24E+00**
Endosulfan I	5.80E-02	1.00E+00	5.80E-02	1.69E+00	9.79E-02	1.00E+00	5.80E-02	6.70E-05	1.22E-02	1.00E+01	2.24E+01	5.00E+01	1.22E-03	5.44E-04	2.43E-04
Endosulfan II	8.30E-01	1.00E+00	8.30E-01	8.86E-01	7.35E-01	1.00E+00	8.30E-01	1.30E-04	1.74E-01	1.00E+01	2.24E+01	5.00E+01	1.74E-02	7.78E-03	3.48E-03
Endrin	1.20E+00	1.00E+00	1.20E+00	5.35E-01	6.42E-01	1.00E+00	1.20E+00	1.30E-04	2.51E-01	3.00E-01	6.71E-01	1.50E+00	8.38E-01	3.75E-01	1.68E-01
gamma-Chlordane	7.80E-01	1.00E+00	7.80E-01	1.65E-01	1.29E-01	1.00E+00	7.80E-01	6.70E-05	1.63E-01	8.00E-01	1.79E+00	4.00E+00	2.04E-01	9.14E-02	4.09E-02
Heptachlor	6.90E-04	1.00E+00	6.90E-04	1.74E-01	1.20E-04	1.00E+00	6.90E-04	6.70E-05	1.56E-04	4.80E-01	1.07E+00	2.40E+00	3.25E-04	1.45E-04	6.49E-05
Heptachlor epoxide	5.40E-01	1.00E+00	5.40E-01	5.66E-01	3.05E-01	1.00E+00	5.40E-01	6.70E-05	1.13E-01	4.80E-01	1.07E+00	2.40E+00	2.36E-01	1.05E-01	4.71E-02
Methoxychlor	5.20E-01	1.00E+00	5.20E-01	5.25E-01	2.73E-01	1.00E+00	5.20E-01	6.70E-04	1.09E-01	3.55E+02	7.94E+02	1.78E+03	3.07E-04	1.37E-04	6.14E-05
Semivolatile Organics															
Acenaphthene	3.00E-01	2.04E+00	6.12E-01	1.55E+00	4.65E-01	1.00E+00	3.00E-01	6.90E-05	7.33E-02	7.10E+00	1.59E+01	3.55E+01	1.03E-02	4.62E-03	2.07E-03
Acenaphthylene	1.20E-01	2.04E+00	2.45E-01	1.31E+00	1.57E-01	1.00E+00	1.20E-01	2.00E-04	2.94E-02	7.10E+00	1.59E+01	3.55E+01	4.13E-03	1.85E-03	8.27E-04
Anthracene	2.60E-01	2.71E-01	7.05E-02	8.61E-01	2.24E-01	1.00E+00	2.60E-01	2.00E-04	4.81E-02	7.10E+00	1.59E+01	3.55E+01	6.78E-03	3.03E-03	1.36E-03
Benzo(a)anthracene	1.50E+00	1.40E+00	2.10E+00	2.94E-01	4.41E-01	1.00E+00	1.50E+00	3.40E-04	3.34E-01	7.10E+00	1.59E+01	3.55E+01	4.71E-02	2.11E-02	9.42E-03
Benzo(a)pyrene	2.10E+00	1.91E-01	4.01E-01	2.01E-01	4.21E-01	1.00E+00	2.10E+00	2.40E-04	3.83E-01	7.10E+00	1.59E+01	3.55E+01	5.39E-02	2.41E-02	1.08E-02
Benzo(b)fluoranthene	3.90E+00	1.60E-01	6.24E-01	3.10E-01	1.21E+00	1.00E+00	3.90E+00	5.80E-04	7.07E-01	7.10E+00	1.59E+01	3.55E+01	9.96E-02	4.46E-02	1.99E-02
Benzo(g,h,i)perylene	1.90E+00	2.95E-01	5.61E-01	1.16E-01	2.20E-01	1.00E+00	1.90E+00	1.60E-04	3.53E-01	7.10E+00	1.59E+01	3.55E+01	4.97E-02	2.22E-02	9.95E-03
Benzo(k)fluoranthene	1.60E+00	4.21E-01	6.74E-01	1.84E-01	2.95E-01	1.00E+00	1.60E+00	1.50E-04	3.04E-01	7.10E+00	1.59E+01	3.55E+01	4.28E-02	1.92E-02	8.57E-03
Chrysene	2.70E+00	3.35E-01	9.05E-01	2.94E-01	7.94E-01	1.00E+00	2.70E+00	8.00E-05	5.05E-01	7.10E+00	1.59E+01	3.55E+01	7.12E-02	3.18E-02	1.42E-02
Dibenz(a,h)anthracene	6.60E-01	2.71E-01	1.79E-01	1.30E-01	8.58E-02	1.00E+00	6.60E-01	2.00E-04	1.22E-01	7.10E+00	1.59E+01	3.55E+01	1.72E-02	7.70E-03	3.44E-03
Fluoranthene	1.80E+00	3.12E-01	5.62E-01	5.00E-01	9.00E-01	1.00E+00	1.80E+00	3.20E-04	3.36E-01	7.10E+00	1.59E+01	3.55E+01	4.73E-02	2.11E-02	9.45E-03

TABLE B-4-5
Summary of Belted Kingfisher Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Fluorene	4.20E-01	1.13E+00	4.75E-01	1.18E+00	4.97E-01	1.00E+00	4.20E-01	2.00E-04	8.99E-02	7.10E+00	1.59E+01	3.55E+01	1.27E-02	5.66E-03	2.53E-03
Indeno(1,2,3-cd)pyrene	2.80E+00	3.55E-01	9.94E-01	1.10E-01	3.08E-01	1.00E+00	2.80E+00	2.40E-04	5.26E-01	7.10E+00	1.59E+01	3.55E+01	7.41E-02	3.31E-02	1.48E-02
Pentachlorophenol	1.10E-01	1.00E+00	1.10E-01	5.93E+00	6.52E-01	1.00E+00	1.10E-01	9.80E-04	2.32E-02	4.26E+00	6.02E+00	8.52E+00	5.45E-03	3.85E-03	2.72E-03
Phenanthrene	4.20E-01	6.52E-01	2.74E-01	8.61E-01	3.62E-01	1.00E+00	4.20E-01	8.80E-05	8.31E-02	7.10E+00	1.59E+01	3.55E+01	1.17E-02	5.23E-03	2.34E-03
Pyrene	3.80E+00	8.03E-01	3.05E+00	7.20E-01	2.74E+00	1.00E+00	3.80E+00	2.90E-04	7.71E-01	7.10E+00	1.59E+01	3.55E+01	1.09E-01	4.86E-02	2.17E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0262 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.160 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.840 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of sediment
WIR = 0.0211 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.125 = Body weight (kg)

TABLE B-4-6
Summary of Great Blue Heron Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.36E+01	6.90E-01	3.01E+01	1.10E+00	4.81E+01	1.26E-01	5.49E+00	5.80E-02	3.58E-01	5.14E+00	8.12E+00	1.28E+01	6.96E-02	4.41E-02	2.79E-02
Cadmium	5.70E+00	3.07E+00	1.75E+01	3.25E+00	1.85E+01	1.64E-01	9.35E-01	8.20E-04	6.04E-02	1.45E+00	5.39E+00	2.00E+01	4.17E-02	1.12E-02	3.02E-03
Chromium	4.97E+01	4.68E-01	2.33E+01	8.39E-02	4.17E+00	3.80E-02	1.89E+00	6.30E-03	1.22E-01	1.00E+00	2.24E+00	5.00E+00	1.22E-01	5.47E-02	2.45E-02
Copper	1.42E+02	7.96E+00	1.13E+03	6.25E-01	8.88E+01	1.00E-01	1.42E+01	2.59E-02	9.19E-01	4.70E+01	5.39E+01	6.17E+01	1.95E-02	1.71E-02	1.49E-02
Lead	4.17E+02	3.26E-01	1.36E+02	4.68E-01	1.95E+02	7.00E-02	2.92E+01	5.90E-03	1.89E+00	3.85E+00	8.61E+00	1.93E+01	4.90E-01	2.19E-01	9.80E-02
Mercury	6.20E-01	2.87E+00	1.78E+00	5.00E+00	3.10E+00	4.58E+00	2.84E+00	2.00E-04	1.83E-01	2.60E-02	4.50E-02	7.80E-02	**7.06E+00**	**4.07E+00**	**2.35E+00**
Nickel	2.36E+01	2.14E-01	5.05E+00	1.41E+00	3.33E+01	1.00E+00	2.36E+01	3.50E-03	1.52E+00	7.74E+01	9.10E+01	1.07E+02	1.97E-02	1.68E-02	1.42E-02
Selenium	1.40E+00	1.00E+00	1.40E+00	3.01E+00	4.22E+00	1.00E+00	1.40E+00	1.30E-03	9.05E-02	1.80E+00	4.02E+00	9.00E+00	5.03E-02	2.25E-02	1.01E-02
Silver	6.10E+00	1.80E-01	1.10E+00	3.67E-02	2.24E-01	1.00E+00	6.10E+00	7.00E-05	3.94E-01	3.56E+01	7.96E+01	1.78E+02	1.11E-02	4.95E-03	2.21E-03
Zinc	4.75E+02	4.76E+00	2.26E+03	1.82E+00	8.65E+02	1.47E-01	6.98E+01	6.54E-02	4.51E+00	1.45E+01	4.36E+01	1.31E+02	3.11E-01	1.04E-01	3.45E-02
Polychlorinated Biphenyls															
Aroclor-1248	1.90E-02	2.19E+01	4.16E-01	1.84E-01	3.50E-03	1.29E+01	2.46E-01	9.30E-04	1.59E-02	1.50E+00	3.35E+00	7.50E+00	1.06E-02	4.75E-03	2.12E-03
Aroclor-1254	2.10E+01	2.19E+01	4.60E+02	1.39E-01	2.93E+00	1.29E+01	2.72E+02	6.70E-04	1.76E+01	1.50E+00	3.35E+00	7.50E+00	**1.17E+01**	**5.23E+00**	**2.34E+00**
Aroclor-1260	1.20E+00	2.19E+01	2.63E+01	1.05E-01	1.26E-01	1.29E+01	1.55E+01	8.00E-04	1.00E+00	1.50E+00	3.35E+00	7.50E+00	6.69E-01	2.99E-01	1.34E-01
Pesticides															
4,4'-DDD	3.80E-01	3.50E-01	1.33E-01	2.02E-01	7.69E-02	2.25E+00	8.55E-01	1.30E-04	5.52E-02	3.00E-01	9.49E-01	3.00E+00	1.84E-01	5.82E-02	1.84E-02
4,4'-DDE	6.00E-01	3.36E+00	2.02E+00	1.09E-01	6.56E-02	2.62E+01	1.57E+01	1.30E-04	1.02E+00	3.00E-01	9.49E-01	3.00E+00	**3.38E+00**	**1.07E+00**	3.38E-01
4,4'-DDT	1.60E+00	2.28E+00	3.65E+00	1.35E-01	2.17E-01	8.80E+00	1.41E+01	1.30E-04	9.09E-01	3.00E-01	9.49E-01	3.00E+00	**3.03E+00**	9.59E-01	3.03E-01
Aldrin	8.50E-04	1.00E+00	8.50E-04	1.39E-01	1.18E-04	1.00E+00	8.50E-04	6.70E-05	5.84E-05	1.55E-01	3.47E-01	7.75E-01	3.77E-04	1.68E-04	7.53E-05
alpha-Chlordane	1.70E-02	1.00E+00	1.70E-02	1.65E-01	2.80E-03	1.00E+00	1.70E-02	6.70E-05	1.10E-03	8.00E-01	1.79E+00	4.00E+00	1.38E-03	6.16E-04	2.75E-04
Dieldrin	1.40E+00	4.92E+00	6.89E+00	4.00E-01	5.60E-01	1.00E+00	1.40E+00	1.30E-04	9.04E-02	7.70E-02	1.72E-01	3.85E-01	**1.17E+00**	5.25E-01	2.35E-01
Endosulfan I	5.80E-02	1.00E+00	5.80E-02	1.69E+00	9.79E-02	1.00E+00	5.80E-02	6.70E-05	3.75E-03	1.00E+01	2.24E+01	5.00E+01	3.75E-04	1.68E-04	7.50E-05
Endosulfan II	8.30E-01	1.00E+00	8.30E-01	8.86E-01	7.35E-01	1.00E+00	8.30E-01	1.30E-04	5.36E-02	1.00E+01	2.24E+01	5.00E+01	5.36E-03	2.40E-03	1.07E-03
Endrin	1.20E+00	1.00E+00	1.20E+00	5.35E-01	6.42E-01	1.00E+00	1.20E+00	1.30E-04	7.75E-02	3.00E-01	6.71E-01	1.50E+00	2.58E-01	1.16E-01	5.17E-02
gamma-Chlordane	7.80E-01	1.00E+00	7.80E-01	1.65E-01	1.29E-01	1.00E+00	7.80E-01	6.70E-05	5.04E-02	8.00E-01	1.79E+00	4.00E+00	6.30E-02	2.82E-02	1.26E-02
Heptachlor	6.90E-04	1.00E+00	6.90E-04	1.74E-01	1.20E-04	1.00E+00	6.90E-04	6.70E-05	4.80E-05	4.80E-01	1.07E+00	2.40E+00	1.00E-04	4.48E-05	2.00E-05
Heptachlor epoxide	5.40E-01	1.00E+00	5.40E-01	5.66E-01	3.05E-01	1.00E+00	5.40E-01	6.70E-05	3.49E-02	4.80E-01	1.07E+00	2.40E+00	7.27E-02	3.25E-02	1.45E-02
Methoxychlor	5.20E-01	1.00E+00	5.20E-01	5.25E-01	2.73E-01	1.00E+00	5.20E-01	6.70E-04	3.36E-02	3.55E+02	7.94E+02	1.78E+03	9.47E-05	4.24E-05	1.89E-05
Semivolatile Organics															
Acenaphthene	3.00E-01	2.04E+00	6.12E-01	1.55E+00	4.65E-01	1.00E+00	3.00E-01	6.90E-05	1.94E-02	7.10E+00	1.59E+01	3.55E+01	2.73E-03	1.22E-03	5.46E-04
Acenaphthylene	1.20E-01	2.04E+00	2.45E-01	1.31E+00	1.57E-01	1.00E+00	1.20E-01	2.00E-04	7.76E-03	7.10E+00	1.59E+01	3.55E+01	1.09E-03	4.89E-04	2.19E-04
Anthracene	2.60E-01	2.71E-01	7.05E-02	8.61E-01	2.24E-01	1.00E+00	2.60E-01	2.00E-04	1.68E-02	7.10E+00	1.59E+01	3.55E+01	2.37E-03	1.06E-03	4.73E-04
Benzo(a)anthracene	1.50E+00	1.40E+00	2.10E+00	2.94E-01	4.41E-01	1.00E+00	1.50E+00	3.40E-04	9.69E-02	7.10E+00	1.59E+01	3.55E+01	1.36E-02	6.10E-03	2.73E-03
Benzo(a)pyrene	2.10E+00	1.91E-01	4.01E-01	2.01E-01	4.21E-01	1.00E+00	2.10E+00	2.40E-04	1.36E-01	7.10E+00	1.59E+01	3.55E+01	1.91E-02	8.54E-03	3.82E-03
Benzo(b)fluoranthene	3.90E+00	1.60E-01	6.24E-01	3.10E-01	1.21E+00	1.00E+00	3.90E+00	5.80E-04	2.52E-01	7.10E+00	1.59E+01	3.55E+01	3.55E-02	1.59E-02	7.10E-03
Benzo(g,h,i)perylene	1.90E+00	2.95E-01	5.61E-01	1.16E-01	2.20E-01	1.00E+00	1.90E+00	1.60E-04	1.23E-01	7.10E+00	1.59E+01	3.55E+01	1.73E-02	7.73E-03	3.46E-03
Benzo(k)fluoranthene	1.60E+00	4.21E-01	6.74E-01	1.84E-01	2.95E-01	1.00E+00	1.60E+00	1.50E-04	1.03E-01	7.10E+00	1.59E+01	3.55E+01	1.46E-02	6.51E-03	2.91E-03
Chrysene	2.70E+00	3.35E-01	9.05E-01	2.94E-01	7.94E-01	1.00E+00	2.70E+00	8.00E-05	1.74E-01	7.10E+00	1.59E+01	3.55E+01	2.46E-02	1.10E-02	4.91E-03
Dibenz(a,h)anthracene	6.60E-01	2.71E-01	1.79E-01	1.30E-01	8.58E-02	1.00E+00	6.60E-01	2.00E-04	4.26E-02	7.10E+00	1.59E+01	3.55E+01	6.01E-03	2.69E-03	1.20E-03
Fluoranthene	1.80E+00	3.12E-01	5.62E-01	5.00E-01	9.00E-01	1.00E+00	1.80E+00	3.20E-04	1.16E-01	7.10E+00	1.59E+01	3.55E+01	1.64E-02	7.32E-03	3.28E-03

TABLE B-4-6
Summary of Great Blue Heron Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Fluorene	4.20E-01	1.13E+00	4.75E-01	1.18E+00	4.97E-01	1.00E+00	4.20E-01	2.00E-04	2.71E-02	7.10E+00	1.59E+01	3.55E+01	3.82E-03	1.71E-03	7.64E-04
Indeno(1,2,3-cd)pyrene	2.80E+00	3.55E-01	9.94E-01	1.10E-01	3.08E-01	1.00E+00	2.80E+00	2.40E-04	1.81E-01	7.10E+00	1.59E+01	3.55E+01	2.55E-02	1.14E-02	5.10E-03
Pentachlorophenol	1.10E-01	1.00E+00	1.10E-01	5.93E+00	6.52E-01	1.00E+00	1.10E-01	9.80E-04	7.16E-03	4.26E+00	6.02E+00	8.52E+00	1.68E-03	1.19E-03	8.40E-04
Phenanthrene	4.20E-01	6.52E-01	2.74E-01	8.61E-01	3.62E-01	1.00E+00	4.20E-01	8.80E-05	2.71E-02	7.10E+00	1.59E+01	3.55E+01	3.82E-03	1.71E-03	7.64E-04
Pyrene	3.80E+00	8.03E-01	3.05E+00	7.20E-01	2.74E+00	1.00E+00	3.80E+00	2.90E-04	2.45E-01	7.10E+00	1.59E+01	3.55E+01	3.46E-02	1.55E-02	6.91E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1356 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of sediment
WIR = 0.1090 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 2.10 = Body weight (kg)

TABLE B-4-7
Summary of Mallard Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.36E+01	6.90E-01	3.01E+01	1.10E+00	4.81E+01	1.26E-01	5.49E+00	5.80E-02	5.41E+00	5.14E+00	8.12E+00	1.28E+01	**1.05E+00**	6.66E-01	4.22E-01
Cadmium	5.70E+00	3.07E+00	1.75E+01	3.25E+00	1.85E+01	1.64E-01	9.35E-01	8.20E-04	2.11E+00	1.45E+00	5.39E+00	2.00E+01	**1.45E+00**	3.92E-01	1.05E-01
Chromium	4.97E+01	4.68E-01	2.33E+01	8.39E-02	4.17E+00	3.80E-02	1.89E+00	6.30E-03	8.89E-01	1.00E+00	2.24E+00	5.00E+00	8.89E-01	3.97E-01	1.78E-01
Copper	1.42E+02	7.96E+00	1.13E+03	6.25E-01	8.88E+01	1.00E-01	1.42E+01	2.59E-02	2.28E+01	4.70E+01	5.39E+01	6.17E+01	4.85E-01	4.23E-01	3.69E-01
Lead	4.17E+02	3.26E-01	1.36E+02	4.68E-01	1.95E+02	7.00E-02	2.92E+01	5.90E-03	2.30E+01	1.13E+00	3.57E+00	1.13E+01	**2.04E+01**	**6.44E+00**	**2.04E+00**
Mercury	6.20E-01	2.87E+00	1.78E+00	5.00E+00	3.10E+00	4.58E+00	2.84E+00	2.00E-04	3.38E-01	2.60E-02	4.50E-02	7.80E-02	**1.30E+01**	**7.51E+00**	**4.33E+00**
Nickel	2.36E+01	2.14E-01	5.05E+00	1.41E+00	3.33E+01	1.00E+00	2.36E+01	3.50E-03	3.53E+00	7.74E+01	9.10E+01	1.07E+02	4.56E-02	3.88E-02	3.30E-02
Selenium	1.40E+00	1.00E+00	1.40E+00	3.01E+00	4.22E+00	1.00E+00	1.40E+00	1.30E-03	4.50E-01	4.00E-01	5.66E-01	8.00E-01	**1.13E+00**	7.96E-01	5.63E-01
Silver	6.10E+00	1.80E-01	1.10E+00	3.67E-02	2.24E-01	1.00E+00	6.10E+00	7.00E-05	5.92E-02	3.56E+01	7.96E+01	1.78E+02	1.66E-03	7.43E-04	3.32E-04
Zinc	4.75E+02	4.76E+00	2.26E+03	1.82E+00	8.65E+02	1.47E-01	6.98E+01	6.54E-02	1.16E+02	1.45E+01	4.36E+01	1.31E+02	**8.01E+00**	**2.66E+00**	8.86E-01
Polychlorinated Biphenyls															
Aroclor-1248	1.90E-02	2.19E+01	4.16E-01	1.84E-01	3.50E-03	1.29E+01	2.46E-01	9.30E-04	5.43E-03	1.50E+00	3.35E+00	7.50E+00	3.62E-03	1.62E-03	7.24E-04
Aroclor-1254	2.10E+01	2.19E+01	4.60E+02	1.39E-01	2.93E+00	1.29E+01	2.72E+02	6.70E-04	5.76E+00	1.50E+00	3.35E+00	7.50E+00	**3.84E+00**	**1.72E+00**	7.68E-01
Aroclor-1260	1.20E+00	2.19E+01	2.63E+01	1.05E-01	1.26E-01	1.29E+01	1.55E+01	8.00E-04	3.25E-01	1.50E+00	3.35E+00	7.50E+00	2.17E-01	9.69E-02	4.34E-02
Pesticides															
4,4'-DDD	3.80E-01	3.50E-01	1.33E-01	2.02E-01	7.69E-02	2.25E+00	8.55E-01	1.30E-04	1.09E-02	1.20E-01	2.68E-01	6.00E-01	9.05E-02	4.05E-02	1.81E-02
4,4'-DDE	6.00E-01	3.36E+00	2.02E+00	1.09E-01	6.56E-02	2.62E+01	1.57E+01	1.30E-04	3.26E-02	1.20E-01	2.68E-01	6.00E-01	2.72E-01	1.22E-01	5.43E-02
4,4'-DDT	1.60E+00	2.28E+00	3.65E+00	1.35E-01	2.17E-01	8.80E+00	1.41E+01	1.30E-04	7.09E-02	6.00E-01	9.49E-01	1.50E+00	1.18E-01	7.48E-02	4.73E-02
Aldrin	8.50E-04	1.00E+00	8.50E-04	1.39E-01	1.18E-04	1.00E+00	8.50E-04	6.70E-05	3.46E-05	1.55E-01	3.47E-01	7.75E-01	2.23E-04	9.97E-05	4.46E-05
alpha-Chlordane	1.70E-02	1.00E+00	1.70E-02	1.65E-01	2.80E-03	1.00E+00	1.70E-02	6.70E-05	5.59E-04	8.00E-01	1.79E+00	4.00E+00	6.98E-04	3.12E-04	1.40E-04
Dieldrin	1.40E+00	4.92E+00	6.89E+00	4.00E-01	5.60E-01	1.00E+00	1.40E+00	1.30E-04	1.43E-01	7.70E-02	1.72E-01	3.85E-01	**1.86E+00**	8.31E-01	3.71E-01
Endosulfan I	5.80E-02	1.00E+00	5.80E-02	1.69E+00	9.79E-02	1.00E+00	5.80E-02	6.70E-05	1.08E-02	1.00E+01	2.24E+01	5.00E+01	1.08E-03	4.85E-04	2.17E-04
Endosulfan II	8.30E-01	1.00E+00	8.30E-01	8.86E-01	7.35E-01	1.00E+00	8.30E-01	1.30E-04	8.76E-02	1.00E+01	2.24E+01	5.00E+01	8.76E-03	3.92E-03	1.75E-03
Endrin	1.20E+00	1.00E+00	1.20E+00	5.35E-01	6.42E-01	1.00E+00	1.20E+00	1.30E-04	8.39E-02	3.00E-01	6.71E-01	1.50E+00	2.80E-01	1.25E-01	5.59E-02
gamma-Chlordane	7.80E-01	1.00E+00	7.80E-01	1.65E-01	1.29E-01	1.00E+00	7.80E-01	6.70E-05	2.52E-02	8.00E-01	1.79E+00	4.00E+00	3.15E-02	1.41E-02	6.30E-03
Heptachlor	6.90E-04	1.00E+00	6.90E-04	1.74E-01	1.20E-04	1.00E+00	6.90E-04	6.70E-05	3.23E-05	4.80E-01	1.07E+00	2.40E+00	6.72E-05	3.01E-05	1.34E-05
Heptachlor epoxide	5.40E-01	1.00E+00	5.40E-01	5.66E-01	3.05E-01	1.00E+00	5.40E-01	6.70E-05	3.94E-02	4.80E-01	1.07E+00	2.40E+00	8.22E-02	3.67E-02	1.64E-02
Methoxychlor	5.20E-01	1.00E+00	5.20E-01	5.25E-01	2.73E-01	1.00E+00	5.20E-01	6.70E-04	3.59E-02	3.55E+02	7.94E+02	1.78E+03	1.01E-04	4.52E-05	2.02E-05
Semivolatile Organics															
Acenaphthene	3.00E-01	2.04E+00	6.12E-01	1.55E+00	4.65E-01	1.00E+00	3.00E-01	6.90E-05	5.56E-02	7.10E+00	1.59E+01	3.55E+01	7.83E-03	3.50E-03	1.57E-03
Acenaphthylene	1.20E-01	2.04E+00	2.45E-01	1.31E+00	1.57E-01	1.00E+00	1.20E-01	2.00E-04	1.93E-02	7.10E+00	1.59E+01	3.55E+01	2.72E-03	1.22E-03	5.45E-04
Anthracene	2.60E-01	2.71E-01	7.05E-02	8.61E-01	2.24E-01	1.00E+00	2.60E-01	2.00E-04	2.46E-02	7.10E+00	1.59E+01	3.55E+01	3.46E-03	1.55E-03	6.93E-04
Benzo(a)anthracene	1.50E+00	1.40E+00	2.10E+00	2.94E-01	4.41E-01	1.00E+00	1.50E+00	3.40E-04	7.52E-02	7.10E+00	1.59E+01	3.55E+01	1.06E-02	4.74E-03	2.12E-03
Benzo(a)pyrene	2.10E+00	1.91E-01	4.01E-01	2.01E-01	4.21E-01	1.00E+00	2.10E+00	2.40E-04	5.56E-02	7.10E+00	1.59E+01	3.55E+01	7.83E-03	3.50E-03	1.57E-03
Benzo(b)fluoranthene	3.90E+00	1.60E-01	6.24E-01	3.10E-01	1.21E+00	1.00E+00	3.90E+00	5.80E-04	1.45E-01	7.10E+00	1.59E+01	3.55E+01	2.05E-02	9.15E-03	4.09E-03
Benzo(g,h,i)perylene	1.90E+00	2.95E-01	5.61E-01	1.16E-01	2.20E-01	1.00E+00	1.90E+00	1.60E-04	3.62E-02	7.10E+00	1.59E+01	3.55E+01	5.10E-03	2.28E-03	1.02E-03
Benzo(k)fluoranthene	1.60E+00	4.21E-01	6.74E-01	1.84E-01	2.95E-01	1.00E+00	1.60E+00	1.50E-04	4.40E-02	7.10E+00	1.59E+01	3.55E+01	6.20E-03	2.77E-03	1.24E-03
Chrysene	2.70E+00	3.35E-01	9.05E-01	2.94E-01	7.94E-01	1.00E+00	2.70E+00	8.00E-05	1.02E-01	7.10E+00	1.59E+01	3.55E+01	1.43E-02	6.40E-03	2.86E-03
Dibenz(a,h)anthracene	6.60E-01	2.71E-01	1.79E-01	1.30E-01	8.58E-02	1.00E+00	6.60E-01	2.00E-04	1.34E-02	7.10E+00	1.59E+01	3.55E+01	1.89E-03	8.43E-04	3.77E-04
Fluoranthene	1.80E+00	3.12E-01	5.62E-01	5.00E-01	9.00E-01	1.00E+00	1.80E+00	3.20E-04	1.05E-01	7.10E+00	1.59E+01	3.55E+01	1.48E-02	6.61E-03	2.96E-03

TABLE B-4-7
Summary of Mallard Exposure Doses - Screening (Step 2)
Upstream Pond

Chemical	Maximum Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Fluorene	4.20E-01	1.13E+00	4.75E-01	1.18E+00	4.97E-01	1.00E+00	4.20E-01	2.00E-04	5.77E-02	7.10E+00	1.59E+01	3.55E+01	8.12E-03	3.63E-03	1.62E-03
Indeno(1,2,3-cd)pyrene	2.80E+00	3.55E-01	9.94E-01	1.10E-01	3.08E-01	1.00E+00	2.80E+00	2.40E-04	5.38E-02	7.10E+00	1.59E+01	3.55E+01	7.57E-03	3.39E-03	1.51E-03
Pentachlorophenol	1.10E-01	1.00E+00	1.10E-01	5.93E+00	6.52E-01	1.00E+00	1.10E-01	9.80E-04	6.81E-02	4.26E+00	6.02E+00	8.52E+00	1.60E-02	1.13E-02	7.99E-03
Phenanthrene	4.20E-01	6.52E-01	2.74E-01	8.61E-01	3.62E-01	1.00E+00	4.20E-01	8.80E-05	4.16E-02	7.10E+00	1.59E+01	3.55E+01	5.85E-03	2.62E-03	1.17E-03
Pyrene	3.80E+00	8.03E-01	3.05E+00	7.20E-01	2.74E+00	1.00E+00	3.80E+00	2.90E-04	3.28E-01	7.10E+00	1.59E+01	3.55E+01	4.62E-02	2.07E-02	9.25E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0717 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.100 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.867 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.033 = Proportion of diet composed of sediment
WIR = 0.0850 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.612 = Body weight (kg)

TABLE B-5-1
Summary of Raccoon Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Upstream Pond

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.04E+01	1.72E-01	1.79E+00	3.71E-02	3.85E-01	1.26E-01	1.31E+00	6.88E-03	3.53E-02	1.20E+00	2.68E+00	6.00E+00	2.94E-02	1.31E-02	5.88E-03
Cadmium	1.87E+00	4.10E-01	7.67E-01	5.86E-01	1.10E+00	1.64E-01	3.07E-01	3.24E-04	1.69E-02	7.50E-01	1.68E+00	3.75E+00	2.25E-02	1.01E-02	4.50E-03
Chromium	2.18E+01	1.15E-01	2.50E+00	4.10E-02	8.94E-01	3.80E-02	8.29E-01	1.20E-03	6.18E-02	3.28E+00	7.33E+00	1.64E+01	1.88E-02	8.42E-03	3.77E-03
Copper	3.99E+01	8.24E-01	3.29E+01	1.23E-01	4.91E+00	1.00E-01	3.99E+00	6.03E-03	3.53E-01	1.17E+01	1.33E+01	1.51E+01	3.02E-02	2.65E-02	2.33E-02
Lead	8.85E+01	8.24E-02	7.30E+00	3.90E-02	3.45E+00	7.00E-02	6.20E+00	1.30E-03	2.31E-01	8.00E+00	2.53E+01	8.00E+01	2.89E-02	9.14E-03	2.89E-03
Mercury	8.79E-02	1.19E+00	1.04E-01	6.52E-01	5.73E-02	3.25E+00	2.86E-01	1.00E-04	1.69E-03	1.50E-01	1.94E-01	2.50E-01	1.12E-02	8.70E-03	6.74E-03
Selenium	3.98E-01	1.00E+00	3.98E-01	5.67E-01	2.26E-01	1.00E+00	3.98E-01	1.96E-03	5.88E-03	2.00E-01	2.57E-01	3.30E-01	2.94E-02	2.29E-02	1.78E-02
Zinc	1.34E+02	8.97E-01	1.21E+02	3.58E-01	4.80E+01	1.47E-01	1.97E+01	2.00E-02	1.49E+00	2.08E+01	4.65E+01	1.04E+02	7.16E-02	3.20E-02	1.43E-02
Polychlorinated Biphenyls															
Aroclor-1254	1.77E+00	4.49E+00	7.94E+00	1.39E-01	2.46E-01	1.29E+01	2.29E+01	2.65E-04	9.25E-02	1.40E-01	3.11E-01	6.90E-01	6.61E-01	2.98E-01	1.34E-01
Aroclor-1260	2.22E-01	4.49E+00	9.97E-01	1.05E-01	2.34E-02	1.29E+01	2.88E+00	3.20E-04	1.16E-02	1.40E-01	3.11E-01	6.90E-01	8.28E-02	3.73E-02	1.68E-02
Pesticides															
4,4'-DDE	6.71E-02	2.00E+00	1.34E-01	1.09E-01	7.33E-03	2.62E+01	1.76E+00	5.17E-05	3.31E-03	1.00E+00	2.24E+00	5.00E+00	3.31E-03	1.48E-03	6.63E-04
4,4'-DDT	1.49E-01	1.30E+00	1.94E-01	1.35E-01	2.02E-02	8.80E+00	1.31E+00	5.17E-05	3.44E-03	1.00E+00	2.24E+00	5.00E+00	3.44E-03	1.54E-03	6.89E-04
Dieldrin	1.23E-01	4.92E+00	6.05E-01	4.00E-01	4.92E-02	1.00E+00	1.23E-01	5.17E-05	5.27E-03	2.80E-02	6.26E-02	1.40E-01	1.88E-01	8.42E-02	3.77E-02
Endrin	1.05E-01	1.00E+00	1.05E-01	5.35E-01	5.59E-02	1.00E+00	1.05E-01	5.17E-05	1.48E-03	1.84E-01	4.11E-01	9.20E-01	8.05E-03	3.60E-03	1.61E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1031 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.436 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.400 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.094 = Proportion of diet composed of sediment
WIR = 0.4921 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 5.94 = Body weight (kg)

TABLE B-5-2
Summary of Mink Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Upstream Pond

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.04E+01	1.72E-01	1.79E+00	3.71E-02	3.85E-01	1.26E-01	1.31E+00	6.88E-03	4.50E-02	1.20E+00	2.68E+00	6.00E+00	3.75E-02	1.68E-02	7.49E-03
Cadmium	1.87E+00	4.10E-01	7.67E-01	5.86E-01	1.10E+00	1.64E-01	3.07E-01	3.24E-04	1.05E-02	7.50E-01	1.68E+00	3.75E+00	1.40E-02	6.27E-03	2.80E-03
Chromium	2.18E+01	1.15E-01	2.50E+00	4.10E-02	8.94E-01	3.80E-02	8.29E-01	1.20E-03	2.84E-02	3.28E+00	7.33E+00	1.64E+01	8.66E-03	3.87E-03	1.73E-03
Copper	3.99E+01	8.24E-01	3.29E+01	1.23E-01	4.91E+00	1.00E-01	3.99E+00	6.03E-03	1.37E-01	1.17E+01	1.33E+01	1.51E+01	1.17E-02	1.03E-02	9.04E-03
Lead	8.85E+01	8.24E-02	7.30E+00	3.90E-02	3.45E+00	7.00E-02	6.20E+00	1.30E-03	2.12E-01	8.00E+00	2.53E+01	8.00E+01	2.65E-02	8.39E-03	2.65E-03
Mercury	8.79E-02	1.19E+00	1.04E-01	6.52E-01	5.73E-02	3.25E+00	2.86E-01	1.00E-04	9.79E-03	1.50E-01	1.94E-01	2.50E-01	6.53E-02	5.06E-02	3.92E-02
Selenium	3.98E-01	1.00E+00	3.98E-01	5.67E-01	2.26E-01	1.00E+00	3.98E-01	1.96E-03	1.37E-02	2.00E-01	2.57E-01	3.30E-01	6.85E-02	5.33E-02	4.15E-02
Zinc	1.34E+02	8.97E-01	1.21E+02	3.58E-01	4.80E+01	1.47E-01	1.97E+01	2.00E-02	6.77E-01	2.08E+01	4.65E+01	1.04E+02	3.25E-02	1.45E-02	6.51E-03
Polychlorinated Biphenyls															
Aroclor-1254	1.77E+00	4.49E+00	7.94E+00	1.39E-01	2.46E-01	1.29E+01	2.29E+01	2.65E-04	7.84E-01	1.40E-01	3.11E-01	6.90E-01	**5.60E+00**	**2.52E+00**	**1.14E+00**
Aroclor-1260	2.22E-01	4.49E+00	9.97E-01	1.05E-01	2.34E-02	1.29E+01	2.88E+00	3.20E-04	9.85E-02	1.40E-01	3.11E-01	6.90E-01	7.04E-01	3.17E-01	1.43E-01
Pesticides															
4,4'-DDE	6.71E-02	2.00E+00	1.34E-01	1.09E-01	7.33E-03	2.62E+01	1.76E+00	5.17E-05	6.02E-02	1.00E+00	2.24E+00	5.00E+00	6.02E-02	2.69E-02	1.20E-02
4,4'-DDT	1.49E-01	1.30E+00	1.94E-01	1.35E-01	2.02E-02	8.80E+00	1.31E+00	5.17E-05	4.49E-02	1.00E+00	2.24E+00	5.00E+00	4.49E-02	2.01E-02	8.97E-03
Dieldrin	1.23E-01	4.92E+00	6.05E-01	4.00E-01	4.92E-02	1.00E+00	1.23E-01	5.17E-05	4.21E-03	2.80E-02	6.26E-02	1.40E-01	1.50E-01	6.73E-02	3.01E-02
Endrin	1.05E-01	1.00E+00	1.05E-01	5.35E-01	5.59E-02	1.00E+00	1.05E-01	5.17E-05	3.58E-03	1.84E-01	4.11E-01	9.20E-01	1.95E-02	8.71E-03	3.89E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0266	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)
PDFi =	1.000	= Proportion of diet composed of food item (fish)
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of sediment
WIR =	0.0218	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.777	= Body weight (kg)

TABLE B-5-3
Summary of Muskrat Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Upstream Pond

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.04E+01	1.72E-01	1.79E+00	3.71E-02	3.85E-01	1.26E-01	1.31E+00	6.88E-03	6.82E-02	2.52E-01	5.63E-01	1.26E+00	2.71E-01	1.21E-01	5.41E-02
Cadmium	1.87E+00	4.10E-01	7.67E-01	5.86E-01	1.10E+00	1.64E-01	3.07E-01	3.24E-04	5.96E-02	1.00E+00	3.16E+00	1.00E+01	5.96E-02	1.89E-02	5.96E-03
Chromium	2.18E+01	1.15E-01	2.50E+00	4.10E-02	8.94E-01	3.80E-02	8.29E-01	1.20E-03	1.46E-01	3.28E+00	7.33E+00	1.64E+01	4.45E-02	1.99E-02	8.90E-03
Copper	3.99E+01	8.24E-01	3.29E+01	1.23E-01	4.91E+00	1.00E-01	3.99E+00	6.03E-03	4.19E-01	7.80E+01	9.01E+01	1.04E+02	5.37E-03	4.65E-03	4.03E-03
Lead	8.85E+01	8.24E-02	7.30E+00	3.90E-02	3.45E+00	7.00E-02	6.20E+00	1.30E-03	5.84E-01	8.00E+00	2.53E+01	8.00E+01	7.30E-02	2.31E-02	7.30E-03
Mercury	8.79E-02	1.19E+00	1.04E-01	6.52E-01	5.73E-02	3.25E+00	2.86E-01	1.00E-04	3.08E-03	3.20E-02	7.16E-02	1.60E-01	9.62E-02	4.30E-02	1.92E-02
Selenium	3.98E-01	1.00E+00	3.98E-01	5.67E-01	2.26E-01	1.00E+00	3.98E-01	1.96E-03	1.25E-02	2.00E-01	2.57E-01	3.30E-01	6.27E-02	4.88E-02	3.80E-02
Zinc	1.34E+02	8.97E-01	1.21E+02	3.58E-01	4.80E+01	1.47E-01	1.97E+01	2.00E-02	2.87E+00	1.60E+02	2.26E+02	3.20E+02	1.79E-02	1.27E-02	8.95E-03
Polychlorinated Biphenyls															
Aroclor-1254	1.77E+00	4.49E+00	7.94E+00	1.39E-01	2.46E-01	1.29E+01	2.29E+01	2.65E-04	1.99E-02	1.36E-01	3.04E-01	6.80E-01	1.46E-01	6.54E-02	2.93E-02
Aroclor-1260	2.22E-01	4.49E+00	9.97E-01	1.05E-01	2.34E-02	1.29E+01	2.88E+00	3.20E-04	2.18E-03	1.36E-01	3.04E-01	6.80E-01	1.60E-02	7.16E-03	3.20E-03
Pesticides															
4,4'-DDE	6.71E-02	2.00E+00	1.34E-01	1.09E-01	7.33E-03	2.62E+01	1.76E+00	5.17E-05	6.65E-04	8.00E-01	1.79E+00	4.00E+00	8.31E-04	3.72E-04	1.66E-04
4,4'-DDT	1.49E-01	1.30E+00	1.94E-01	1.35E-01	2.02E-02	8.80E+00	1.31E+00	5.17E-05	1.65E-03	8.00E-01	1.79E+00	4.00E+00	2.06E-03	9.23E-04	4.13E-04
Dieldrin	1.23E-01	4.92E+00	6.05E-01	4.00E-01	4.92E-02	1.00E+00	1.23E-01	5.17E-05	2.87E-03	4.00E-02	8.94E-02	2.00E-01	7.17E-02	3.21E-02	1.43E-02
Endrin	1.05E-01	1.00E+00	1.05E-01	5.35E-01	5.59E-02	1.00E+00	1.05E-01	5.17E-05	3.09E-03	1.84E-01	4.11E-01	9.20E-01	1.68E-02	7.51E-03	3.36E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0596 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.906 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.094 = Proportion of diet composed of sediment
WIR = 0.1139 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 1.169 = Body weight (kg)

TABLE B-5-4
Summary of Marsh Wren Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Upstream Pond

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.04E+01	1.72E-01	1.79E+00	3.71E-02	3.85E-01	1.26E-01	1.31E+00	6.88E-03	4.91E-01	2.46E+00	4.26E+00	7.38E+00	2.00E-01	1.15E-01	6.66E-02
Cadmium	1.87E+00	4.10E-01	7.67E-01	5.86E-01	1.10E+00	1.64E-01	3.07E-01	3.24E-04	1.82E-01	1.45E+00	5.39E+00	2.00E+01	1.25E-01	3.38E-02	9.09E-03
Chromium	2.18E+01	1.15E-01	2.50E+00	4.10E-02	8.94E-01	3.80E-02	8.29E-01	1.20E-03	7.66E-01	1.00E+00	2.24E+00	5.00E+00	7.66E-01	3.42E-01	1.53E-01
Copper	3.99E+01	8.24E-01	3.29E+01	1.23E-01	4.91E+00	1.00E-01	3.99E+00	6.03E-03	7.35E+00	4.70E+01	5.39E+01	6.17E+01	1.56E-01	1.36E-01	1.19E-01
Lead	8.85E+01	8.24E-02	7.30E+00	3.90E-02	3.45E+00	7.00E-02	6.20E+00	1.30E-03	2.51E+00	3.85E+00	8.61E+00	1.93E+01	6.52E-01	2.92E-01	1.30E-01
Mercury	8.79E-02	1.19E+00	1.04E-01	6.52E-01	5.73E-02	3.25E+00	2.86E-01	1.00E-04	2.29E-02	2.60E-02	4.50E-02	7.80E-02	8.80E-01	5.08E-01	2.93E-01
Selenium	3.98E-01	1.00E+00	3.98E-01	5.67E-01	2.26E-01	1.00E+00	3.98E-01	1.96E-03	8.85E-02	4.00E-01	5.66E-01	8.00E-01	2.21E-01	1.57E-01	1.11E-01
Zinc	1.34E+02	8.97E-01	1.21E+02	3.58E-01	4.80E+01	1.47E-01	1.97E+01	2.00E-02	2.68E+01	1.45E+01	4.36E+01	1.31E+02	**1.85E+00**	6.15E-01	2.05E-01
Polychlorinated Biphenyls															
Aroclor-1254	1.77E+00	4.49E+00	7.94E+00	1.39E-01	2.46E-01	1.29E+01	2.29E+01	2.65E-04	1.69E+00	1.50E+00	3.35E+00	7.50E+00	**1.12E+00**	5.03E-01	2.25E-01
Aroclor-1260	2.22E-01	4.49E+00	9.97E-01	1.05E-01	2.34E-02	1.29E+01	2.88E+00	3.20E-04	2.12E-01	1.50E+00	3.35E+00	7.50E+00	1.41E-01	6.32E-02	2.83E-02
Pesticides															
4,4'-DDE	6.71E-02	2.00E+00	1.34E-01	1.09E-01	7.33E-03	2.62E+01	1.76E+00	5.17E-05	2.89E-02	1.20E-01	2.68E-01	6.00E-01	2.41E-01	1.08E-01	4.82E-02
4,4'-DDT	1.49E-01	1.30E+00	1.94E-01	1.35E-01	2.02E-02	8.80E+00	1.31E+00	5.17E-05	4.23E-02	6.00E-01	9.49E-01	1.50E+00	7.05E-02	4.46E-02	2.82E-02
Dieldrin	1.23E-01	4.92E+00	6.05E-01	4.00E-01	4.92E-02	1.00E+00	1.23E-01	5.17E-05	1.28E-01	7.70E-02	1.72E-01	3.85E-01	**1.67E+00**	7.46E-01	3.33E-01
Endrin	1.05E-01	1.00E+00	1.05E-01	5.35E-01	5.59E-02	1.00E+00	1.05E-01	5.17E-05	2.31E-02	3.00E-01	6.71E-01	1.50E+00	7.71E-02	3.45E-02	1.54E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0025	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi =	0.950	= Proportion of diet composed of food item (aquatic invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (fish)
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)
PDS =	0.050	= Proportion of diet composed of sediment
WIR =	0.0029	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0113	= Body weight (kg)

TABLE B-5-5

Summary of Belted Kingfisher Exposure Doses - Baseline (Step 3A) - Arithmetic Mean

Upstream Pond

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.04E+01	1.72E-01	1.79E+00	3.71E-02	3.85E-01	1.26E-01	1.31E+00	6.88E-03	1.69E-01	5.14E+00	8.12E+00	1.28E+01	3.29E-02	2.08E-02	1.32E-02
Cadmium	1.87E+00	4.10E-01	7.67E-01	5.86E-01	1.10E+00	1.64E-01	3.07E-01	3.24E-04	4.64E-02	1.45E+00	5.39E+00	2.00E+01	3.20E-02	8.61E-03	2.32E-03
Chromium	2.18E+01	1.15E-01	2.50E+00	4.10E-02	8.94E-01	3.80E-02	8.29E-01	1.20E-03	1.34E-01	1.00E+00	2.24E+00	5.00E+00	1.34E-01	5.98E-02	2.67E-02
Copper	3.99E+01	8.24E-01	3.29E+01	1.23E-01	4.91E+00	1.00E-01	3.99E+00	6.03E-03	1.05E+00	4.70E+01	5.39E+01	6.17E+01	2.23E-02	1.95E-02	1.70E-02
Lead	8.85E+01	8.24E-02	7.30E+00	3.90E-02	3.45E+00	7.00E-02	6.20E+00	1.30E-03	7.76E-01	3.85E+00	8.61E+00	1.93E+01	2.02E-01	9.02E-02	4.03E-02
Mercury	8.79E-02	1.19E+00	1.04E-01	6.52E-01	5.73E-02	3.25E+00	2.86E-01	1.00E-04	3.13E-02	2.60E-02	4.50E-02	7.80E-02	**1.20E+00**	6.95E-01	4.01E-01
Selenium	3.98E-01	1.00E+00	3.98E-01	5.67E-01	2.26E-01	1.00E+00	3.98E-01	1.96E-03	4.87E-02	1.80E+00	4.02E+00	9.00E+00	2.71E-02	1.21E-02	5.41E-03
Zinc	1.34E+02	8.97E-01	1.21E+02	3.58E-01	4.80E+01	1.47E-01	1.97E+01	2.00E-02	4.37E+00	1.45E+01	4.36E+01	1.31E+02	3.01E-01	1.00E-01	3.34E-02
Polychlorinated Biphenyls															
Aroclor-1254	1.77E+00	4.49E+00	7.94E+00	1.39E-01	2.46E-01	1.29E+01	2.29E+01	2.65E-04	2.50E+00	1.50E+00	3.35E+00	7.50E+00	**1.66E+00**	7.45E-01	3.33E-01
Aroclor-1260	2.22E-01	4.49E+00	9.97E-01	1.05E-01	2.34E-02	1.29E+01	2.88E+00	3.20E-04	3.14E-01	1.50E+00	3.35E+00	7.50E+00	2.09E-01	9.35E-02	4.18E-02
Pesticides															
4,4'-DDE	6.71E-02	2.00E+00	1.34E-01	1.09E-01	7.33E-03	2.62E+01	1.76E+00	5.17E-05	1.82E-01	3.00E-01	9.49E-01	3.00E+00	6.08E-01	1.92E-01	6.08E-02
4,4'-DDT	1.49E-01	1.30E+00	1.94E-01	1.35E-01	2.02E-02	8.80E+00	1.31E+00	5.17E-05	1.38E-01	3.00E-01	9.49E-01	3.00E+00	4.59E-01	1.45E-01	4.59E-02
Dieldrin	1.23E-01	4.92E+00	6.05E-01	4.00E-01	4.92E-02	1.00E+00	1.23E-01	5.17E-05	2.44E-02	7.70E-02	1.72E-01	3.85E-01	3.17E-01	1.42E-01	6.33E-02
Endrin	1.05E-01	1.00E+00	1.05E-01	5.35E-01	5.59E-02	1.00E+00	1.05E-01	5.17E-05	1.27E-02	3.00E-01	6.71E-01	1.50E+00	4.25E-02	1.90E-02	8.49E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0180 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.160 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.840 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of sediment
WIR = 0.0164 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.148 = Body weight (kg)

TABLE B-5-6
Summary of Great Blue Heron Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Upstream Pond

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.04E+01	1.72E-01	1.79E+00	3.71E-02	3.85E-01	1.26E-01	1.31E+00	6.88E-03	7.38E-02	5.14E+00	8.12E+00	1.28E+01	1.44E-02	9.09E-03	5.75E-03
Cadmium	1.87E+00	4.10E-01	7.67E-01	5.86E-01	1.10E+00	1.64E-01	3.07E-01	3.24E-04	1.73E-02	1.45E+00	5.39E+00	2.00E+01	1.19E-02	3.21E-03	8.63E-04
Chromium	2.18E+01	1.15E-01	2.50E+00	4.10E-02	8.94E-01	3.80E-02	8.29E-01	1.20E-03	4.67E-02	1.00E+00	2.24E+00	5.00E+00	4.67E-02	2.09E-02	9.33E-03
Copper	3.99E+01	8.24E-01	3.29E+01	1.23E-01	4.91E+00	1.00E-01	3.99E+00	6.03E-03	2.25E-01	4.70E+01	5.39E+01	6.17E+01	4.78E-03	4.17E-03	3.64E-03
Lead	8.85E+01	8.24E-02	7.30E+00	3.90E-02	3.45E+00	7.00E-02	6.20E+00	1.30E-03	3.49E-01	3.85E+00	8.61E+00	1.93E+01	9.06E-02	4.05E-02	1.81E-02
Mercury	8.79E-02	1.19E+00	1.04E-01	6.52E-01	5.73E-02	3.25E+00	2.86E-01	1.00E-04	1.61E-02	2.60E-02	4.50E-02	7.80E-02	6.18E-01	3.57E-01	2.06E-01
Selenium	3.98E-01	1.00E+00	3.98E-01	5.67E-01	2.26E-01	1.00E+00	3.98E-01	1.96E-03	2.25E-02	1.80E+00	4.02E+00	9.00E+00	1.25E-02	5.59E-03	2.50E-03
Zinc	1.34E+02	8.97E-01	1.21E+02	3.58E-01	4.80E+01	1.47E-01	1.97E+01	2.00E-02	1.11E+00	1.45E+01	4.36E+01	1.31E+02	7.66E-02	2.55E-02	8.48E-03
Polychlorinated Biphenyls															
Aroclor-1254	1.77E+00	4.49E+00	7.94E+00	1.39E-01	2.46E-01	1.29E+01	2.29E+01	2.65E-04	1.29E+00	1.50E+00	3.35E+00	7.50E+00	8.59E-01	3.84E-01	1.72E-01
Aroclor-1260	2.22E-01	4.49E+00	9.97E-01	1.05E-01	2.34E-02	1.29E+01	2.88E+00	3.20E-04	1.62E-01	1.50E+00	3.35E+00	7.50E+00	1.08E-01	4.82E-02	2.16E-02
Pesticides															
4,4'-DDE	6.71E-02	2.00E+00	1.34E-01	1.09E-01	7.33E-03	2.62E+01	1.76E+00	5.17E-05	9.88E-02	3.00E-01	9.49E-01	3.00E+00	3.29E-01	1.04E-01	3.29E-02
4,4'-DDT	1.49E-01	1.30E+00	1.94E-01	1.35E-01	2.02E-02	8.80E+00	1.31E+00	5.17E-05	7.37E-02	3.00E-01	9.49E-01	3.00E+00	2.46E-01	7.77E-02	2.46E-02
Dieldrin	1.23E-01	4.92E+00	6.05E-01	4.00E-01	4.92E-02	1.00E+00	1.23E-01	5.17E-05	6.92E-03	7.70E-02	1.72E-01	3.85E-01	8.98E-02	4.02E-02	1.80E-02
Endrin	1.05E-01	1.00E+00	1.05E-01	5.35E-01	5.59E-02	1.00E+00	1.05E-01	5.17E-05	5.88E-03	3.00E-01	6.71E-01	1.50E+00	1.96E-02	8.77E-03	3.92E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1254 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of sediment
WIR = 0.1010 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 2.23 = Body weight (kg)

TABLE B-5-7
Summary of Mallard Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
Upstream Pond

Chemical	Mean Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.04E+01	1.72E-01	1.79E+00	3.71E-02	3.85E-01	1.26E-01	1.31E+00	6.88E-03	4.13E-02	5.14E+00	8.12E+00	1.28E+01	8.04E-03	5.09E-03	3.22E-03
Cadmium	1.87E+00	4.10E-01	7.67E-01	5.86E-01	1.10E+00	1.64E-01	3.07E-01	3.24E-04	5.22E-02	1.45E+00	5.39E+00	2.00E+01	3.60E-02	9.69E-03	2.61E-03
Chromium	2.18E+01	1.15E-01	2.50E+00	4.10E-02	8.94E-01	3.80E-02	8.29E-01	1.20E-03	8.37E-02	1.00E+00	2.24E+00	5.00E+00	8.37E-02	3.74E-02	1.67E-02
Copper	3.99E+01	8.24E-01	3.29E+01	1.23E-01	4.91E+00	1.00E-01	3.99E+00	6.03E-03	4.25E-01	4.70E+01	5.39E+01	6.17E+01	9.05E-03	7.90E-03	6.89E-03
Lead	8.85E+01	8.24E-02	7.30E+00	3.90E-02	3.45E+00	7.00E-02	6.20E+00	1.30E-03	3.19E-01	1.13E+00	3.57E+00	1.13E+01	2.82E-01	8.92E-02	2.82E-02
Mercury	8.79E-02	1.19E+00	1.04E-01	6.52E-01	5.73E-02	3.25E+00	2.86E-01	1.00E-04	3.03E-03	2.60E-02	4.50E-02	7.80E-02	1.16E-01	6.72E-02	3.88E-02
Selenium	3.98E-01	1.00E+00	3.98E-01	5.67E-01	2.26E-01	1.00E+00	3.98E-01	1.96E-03	1.20E-02	4.00E-01	5.66E-01	8.00E-01	3.01E-02	2.13E-02	1.50E-02
Zinc	1.34E+02	8.97E-01	1.21E+02	3.58E-01	4.80E+01	1.47E-01	1.97E+01	2.00E-02	2.79E+00	1.45E+01	4.36E+01	1.31E+02	1.92E-01	6.40E-02	2.13E-02
Polychlorinated Biphenyls															
Aroclor-1254	1.77E+00	4.49E+00	7.94E+00	1.39E-01	2.46E-01	1.29E+01	2.29E+01	2.65E-04	5.11E-02	1.50E+00	3.35E+00	7.50E+00	3.41E-02	1.52E-02	6.82E-03
Aroclor-1260	2.22E-01	4.49E+00	9.97E-01	1.05E-01	2.34E-02	1.29E+01	2.88E+00	3.20E-04	6.12E-03	1.50E+00	3.35E+00	7.50E+00	4.08E-03	1.83E-03	8.16E-04
Pesticides															
4,4'-DDE	6.71E-02	2.00E+00	1.34E-01	1.09E-01	7.33E-03	2.62E+01	1.76E+00	5.17E-05	1.06E-03	1.20E-01	2.68E-01	6.00E-01	8.80E-03	3.94E-03	1.76E-03
4,4'-DDT	1.49E-01	1.30E+00	1.94E-01	1.35E-01	2.02E-02	8.80E+00	1.31E+00	5.17E-05	2.00E-03	6.00E-01	9.49E-01	1.50E+00	3.34E-03	2.11E-03	1.34E-03
Dieldrin	1.23E-01	4.92E+00	6.05E-01	4.00E-01	4.92E-02	1.00E+00	1.23E-01	5.17E-05	5.14E-03	7.70E-02	1.72E-01	3.85E-01	6.68E-02	2.99E-02	1.34E-02
Endrin	1.05E-01	1.00E+00	1.05E-01	5.35E-01	5.59E-02	1.00E+00	1.05E-01	5.17E-05	2.99E-03	3.00E-01	6.71E-01	1.50E+00	9.98E-03	4.46E-03	2.00E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0564 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.100 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.867 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.033 = Proportion of diet composed of sediment
WIR = 0.0658 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 1.177 = Body weight (kg)

TABLE B-6-1
Summary of Raccoon Exposure Doses - Baseline (Step 3A) - 95% UCL
Upstream Pond

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.62E+01	1.72E-01	2.80E+00	3.71E-02	6.02E-01	1.26E-01	2.05E+00	1.46E-02	5.55E-02	1.20E+00	2.68E+00	6.00E+00	4.63E-02	2.07E-02	9.25E-03
Cadmium	2.87E+00	4.10E-01	1.18E+00	5.86E-01	1.68E+00	1.64E-01	4.71E-01	4.29E-04	2.59E-02	7.50E-01	1.68E+00	3.75E+00	3.45E-02	1.55E-02	6.91E-03
Chromium	2.92E+01	1.15E-01	3.34E+00	4.10E-02	1.20E+00	3.80E-02	1.11E+00	1.55E-03	8.26E-02	3.28E+00	7.33E+00	1.64E+01	2.52E-02	1.13E-02	5.04E-03
Copper	6.18E+01	8.24E-01	5.09E+01	1.23E-01	7.60E+00	1.00E-01	6.18E+00	9.20E-03	5.47E-01	1.17E+01	1.33E+01	1.51E+01	4.67E-02	4.11E-02	3.61E-02
Lead	1.55E+02	8.24E-02	1.28E+01	3.90E-02	6.04E+00	7.00E-02	1.08E+01	2.07E-03	4.04E-01	8.00E+00	2.53E+01	8.00E+01	5.05E-02	1.60E-02	5.05E-03
Mercury	1.77E-01	1.19E+00	2.10E-01	6.52E-01	1.15E-01	3.25E+00	5.74E-01	1.00E-04	3.38E-03	1.50E-01	1.94E-01	2.50E-01	2.25E-02	1.75E-02	1.35E-02
Selenium	5.76E-01	1.00E+00	5.76E-01	5.67E-01	3.27E-01	1.00E+00	5.76E-01	2.32E-03	8.46E-03	2.00E-01	2.57E-01	3.30E-01	4.23E-02	3.29E-02	2.56E-02
Zinc	2.01E+02	8.97E-01	1.80E+02	3.58E-01	7.18E+01	1.47E-01	2.95E+01	2.76E-02	2.23E+00	2.08E+01	4.65E+01	1.04E+02	1.07E-01	4.79E-02	2.14E-02
Polychlorinated Biphenyls															
Aroclor-1254	4.91E+00	4.49E+00	2.20E+01	1.39E-01	6.84E-01	1.29E+01	6.35E+01	2.84E-04	2.57E-01	1.40E-01	3.11E-01	6.90E-01	**1.83E+00**	8.26E-01	3.72E-01
Aroclor-1260	3.87E-01	4.49E+00	1.74E+00	1.05E-01	4.07E-02	1.29E+01	5.01E+00	3.41E-04	2.02E-02	1.40E-01	3.11E-01	6.90E-01	1.44E-01	6.49E-02	2.92E-02
Pesticides															
4,4'-DDE	1.57E-01	2.00E+00	3.14E-01	1.09E-01	1.72E-02	2.62E+01	4.12E+00	5.52E-05	7.76E-03	1.00E+00	2.24E+00	5.00E+00	7.76E-03	3.47E-03	1.55E-03
4,4'-DDT	3.86E-01	1.30E+00	5.02E-01	1.35E-01	5.23E-02	8.80E+00	3.40E+00	5.52E-05	8.93E-03	1.00E+00	2.24E+00	5.00E+00	8.93E-03	3.99E-03	1.79E-03
Dieldrin	3.32E-01	4.92E+00	1.63E+00	4.00E-01	1.33E-01	1.00E+00	3.32E-01	5.52E-05	1.42E-02	2.80E-02	6.26E-02	1.40E-01	5.08E-01	2.27E-01	1.02E-01
Endrin	2.83E-01	1.00E+00	2.83E-01	5.35E-01	1.52E-01	1.00E+00	2.83E-01	5.52E-05	4.01E-03	1.84E-01	4.11E-01	9.20E-01	2.18E-02	9.74E-03	4.36E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1031 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.436 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.400 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.094 = Proportion of diet composed of sediment
WIR = 0.4921 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 5.94 = Body weight (kg)

TABLE B-6-2
Summary of Mink Exposure Doses - Baseline (Step 3A) - 95% UCL
Upstream Pond

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.62E+01	1.72E-01	2.80E+00	3.71E-02	6.02E-01	1.26E-01	2.05E+00	1.46E-02	7.05E-02	1.20E+00	2.68E+00	6.00E+00	5.87E-02	2.63E-02	1.17E-02
Cadmium	2.87E+00	4.10E-01	1.18E+00	5.86E-01	1.68E+00	1.64E-01	4.71E-01	4.29E-04	1.62E-02	7.50E-01	1.68E+00	3.75E+00	2.15E-02	9.63E-03	4.31E-03
Chromium	2.92E+01	1.15E-01	3.34E+00	4.10E-02	1.20E+00	3.80E-02	1.11E+00	1.55E-03	3.80E-02	3.28E+00	7.33E+00	1.64E+01	1.16E-02	5.18E-03	2.32E-03
Copper	6.18E+01	8.24E-01	5.09E+01	1.23E-01	7.60E+00	1.00E-01	6.18E+00	9.20E-03	2.12E-01	1.17E+01	1.33E+01	1.51E+01	1.81E-02	1.59E-02	1.40E-02
Lead	1.55E+02	8.24E-02	1.28E+01	3.90E-02	6.04E+00	7.00E-02	1.08E+01	2.07E-03	3.71E-01	8.00E+00	2.53E+01	8.00E+01	4.64E-02	1.47E-02	4.64E-03
Mercury	1.77E-01	1.19E+00	2.10E-01	6.52E-01	1.15E-01	3.25E+00	5.74E-01	1.00E-04	1.97E-02	1.50E-01	1.94E-01	2.50E-01	1.31E-01	1.02E-01	7.87E-02
Selenium	5.76E-01	1.00E+00	5.76E-01	5.67E-01	3.27E-01	1.00E+00	5.76E-01	2.32E-03	1.98E-02	2.00E-01	2.57E-01	3.30E-01	9.90E-02	7.71E-02	6.00E-02
Zinc	2.01E+02	8.97E-01	1.80E+02	3.58E-01	7.18E+01	1.47E-01	2.95E+01	2.76E-02	1.01E+00	2.08E+01	4.65E+01	1.04E+02	4.86E-02	2.17E-02	9.72E-03
Polychlorinated Biphenyls															
Aroclor-1254	4.91E+00	4.49E+00	2.20E+01	1.39E-01	6.84E-01	1.29E+01	6.35E+01	2.84E-04	2.18E+00	1.40E-01	3.11E-01	6.90E-01	**1.55E+01**	**7.00E+00**	**3.15E+00**
Aroclor-1260	3.87E-01	4.49E+00	1.74E+00	1.05E-01	4.07E-02	1.29E+01	5.01E+00	3.41E-04	1.72E-01	1.40E-01	3.11E-01	6.90E-01	**1.23E+00**	5.52E-01	2.49E-01
Pesticides															
4,4'-DDE	1.57E-01	2.00E+00	3.14E-01	1.09E-01	1.72E-02	2.62E+01	4.12E+00	5.52E-05	1.41E-01	1.00E+00	2.24E+00	5.00E+00	1.41E-01	6.31E-02	2.82E-02
4,4'-DDT	3.86E-01	1.30E+00	5.02E-01	1.35E-01	5.23E-02	8.80E+00	3.40E+00	5.52E-05	1.16E-01	1.00E+00	2.24E+00	5.00E+00	1.16E-01	5.21E-02	2.33E-02
Dieldrin	3.32E-01	4.92E+00	1.63E+00	4.00E-01	1.33E-01	1.00E+00	3.32E-01	5.52E-05	1.14E-02	2.80E-02	6.26E-02	1.40E-01	4.06E-01	1.81E-01	8.11E-02
Endrin	2.83E-01	1.00E+00	2.83E-01	5.35E-01	1.52E-01	1.00E+00	2.83E-01	5.52E-05	9.71E-03	1.84E-01	4.11E-01	9.20E-01	5.28E-02	2.36E-02	1.06E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0266	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)
PDFi =	1.000	= Proportion of diet composed of food item (fish)
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of sediment
WIR =	0.0218	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.777	= Body weight (kg)

TABLE B-6-3
Summary of Muskrat Exposure Doses - Baseline (Step 3A) - 95% UCL
Upstream Pond

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.62E+01	1.72E-01	2.80E+00	3.71E-02	6.02E-01	1.26E-01	2.05E+00	1.46E-02	1.07E-01	2.52E-01	5.63E-01	1.26E+00	4.25E-01	1.90E-01	8.50E-02
Cadmium	2.87E+00	4.10E-01	1.18E+00	5.86E-01	1.68E+00	1.64E-01	4.71E-01	4.29E-04	9.17E-02	1.00E+00	3.16E+00	1.00E+01	9.17E-02	2.90E-02	9.17E-03
Chromium	2.92E+01	1.15E-01	3.34E+00	4.10E-02	1.20E+00	3.80E-02	1.11E+00	1.55E-03	1.95E-01	3.28E+00	7.33E+00	1.64E+01	5.95E-02	2.66E-02	1.19E-02
Copper	6.18E+01	8.24E-01	5.09E+01	1.23E-01	7.60E+00	1.00E-01	6.18E+00	9.20E-03	6.48E-01	7.80E+01	9.01E+01	1.04E+02	8.31E-03	7.20E-03	6.23E-03
Lead	1.55E+02	8.24E-02	1.28E+01	3.90E-02	6.04E+00	7.00E-02	1.08E+01	2.07E-03	1.02E+00	8.00E+00	2.53E+01	8.00E+01	1.28E-01	4.04E-02	1.28E-02
Mercury	1.77E-01	1.19E+00	2.10E-01	6.52E-01	1.15E-01	3.25E+00	5.74E-01	1.00E-04	6.18E-03	3.20E-02	7.16E-02	1.60E-01	1.93E-01	8.64E-02	3.86E-02
Selenium	5.76E-01	1.00E+00	5.76E-01	5.67E-01	3.27E-01	1.00E+00	5.76E-01	2.32E-03	1.81E-02	2.00E-01	2.57E-01	3.30E-01	9.05E-02	7.04E-02	5.48E-02
Zinc	2.01E+02	8.97E-01	1.80E+02	3.58E-01	7.18E+01	1.47E-01	2.95E+01	2.76E-02	4.28E+00	1.60E+02	2.26E+02	3.20E+02	2.68E-02	1.89E-02	1.34E-02
Polychlorinated Biphenyls															
Aroclor-1254	4.91E+00	4.49E+00	2.20E+01	1.39E-01	6.84E-01	1.29E+01	6.35E+01	2.84E-04	5.52E-02	1.36E-01	3.04E-01	6.80E-01	4.06E-01	1.81E-01	8.11E-02
Aroclor-1260	3.87E-01	4.49E+00	1.74E+00	1.05E-01	4.07E-02	1.29E+01	5.01E+00	3.41E-04	3.77E-03	1.36E-01	3.04E-01	6.80E-01	2.77E-02	1.24E-02	5.55E-03
Pesticides															
4,4'-DDE	1.57E-01	2.00E+00	3.14E-01	1.09E-01	1.72E-02	2.62E+01	4.12E+00	5.52E-05	1.55E-03	8.00E-01	1.79E+00	4.00E+00	1.94E-03	8.68E-04	3.88E-04
4,4'-DDT	3.86E-01	1.30E+00	5.02E-01	1.35E-01	5.23E-02	8.80E+00	3.40E+00	5.52E-05	4.27E-03	8.00E-01	1.79E+00	4.00E+00	5.34E-03	2.39E-03	1.07E-03
Dieldrin	3.32E-01	4.92E+00	1.63E+00	4.00E-01	1.33E-01	1.00E+00	3.32E-01	5.52E-05	7.73E-03	4.00E-02	8.94E-02	2.00E-01	1.93E-01	8.64E-02	3.86E-02
Endrin	2.83E-01	1.00E+00	2.83E-01	5.35E-01	1.52E-01	1.00E+00	2.83E-01	5.52E-05	8.37E-03	1.84E-01	4.11E-01	9.20E-01	4.55E-02	2.03E-02	9.09E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0596	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi =	0.906	= Proportion of diet composed of food item (aquatic plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (fish)
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)
PDS =	0.094	= Proportion of diet composed of sediment
WIR =	0.1139	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	1.169	= Body weight (kg)

TABLE B-6-4
Summary of Marsh Wren Exposure Doses - Baseline (Step 3A) - 95% UCL
Upstream Pond

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.62E+01	1.72E-01	2.80E+00	3.71E-02	6.02E-01	1.26E-01	2.05E+00	1.46E-02	7.70E-01	2.46E+00	4.26E+00	7.38E+00	3.13E-01	1.81E-01	1.04E-01
Cadmium	2.87E+00	4.10E-01	1.18E+00	5.86E-01	1.68E+00	1.64E-01	4.71E-01	4.29E-04	2.79E-01	1.45E+00	5.39E+00	2.00E+01	1.93E-01	5.19E-02	1.40E-02
Chromium	2.92E+01	1.15E-01	3.34E+00	4.10E-02	1.20E+00	3.80E-02	1.11E+00	1.55E-03	1.02E+00	1.00E+00	2.24E+00	5.00E+00	**1.02E+00**	4.58E-01	2.05E-01
Copper	6.18E+01	8.24E-01	5.09E+01	1.23E-01	7.60E+00	1.00E-01	6.18E+00	9.20E-03	1.14E+01	4.70E+01	5.39E+01	6.17E+01	2.42E-01	2.11E-01	1.84E-01
Lead	1.55E+02	8.24E-02	1.28E+01	3.90E-02	6.04E+00	7.00E-02	1.08E+01	2.07E-03	4.39E+00	3.85E+00	8.61E+00	1.93E+01	**1.14E+00**	5.10E-01	2.28E-01
Mercury	1.77E-01	1.19E+00	2.10E-01	6.52E-01	1.15E-01	3.25E+00	5.74E-01	1.00E-04	4.60E-02	2.60E-02	4.50E-02	7.80E-02	**1.77E+00**	**1.02E+00**	5.90E-01
Selenium	5.76E-01	1.00E+00	5.76E-01	5.67E-01	3.27E-01	1.00E+00	5.76E-01	2.32E-03	1.28E-01	4.00E-01	5.66E-01	8.00E-01	3.20E-01	2.26E-01	1.60E-01
Zinc	2.01E+02	8.97E-01	1.80E+02	3.58E-01	7.18E+01	1.47E-01	2.95E+01	2.76E-02	4.00E+01	1.45E+01	4.36E+01	1.31E+02	**2.76E+00**	9.19E-01	3.06E-01
Polychlorinated Biphenyls															
Aroclor-1254	4.91E+00	4.49E+00	2.20E+01	1.39E-01	6.84E-01	1.29E+01	6.35E+01	2.84E-04	4.68E+00	1.50E+00	3.35E+00	7.50E+00	**3.12E+00**	**1.40E+00**	6.24E-01
Aroclor-1260	3.87E-01	4.49E+00	1.74E+00	1.05E-01	4.07E-02	1.29E+01	5.01E+00	3.41E-04	3.69E-01	1.50E+00	3.35E+00	7.50E+00	2.46E-01	1.10E-01	4.92E-02
Pesticides															
4,4'-DDE	1.57E-01	2.00E+00	3.14E-01	1.09E-01	1.72E-02	2.62E+01	4.12E+00	5.52E-05	6.77E-02	1.20E-01	2.68E-01	6.00E-01	5.64E-01	2.52E-01	1.13E-01
4,4'-DDT	3.86E-01	1.30E+00	5.02E-01	1.35E-01	5.23E-02	8.80E+00	3.40E+00	5.52E-05	1.10E-01	6.00E-01	9.49E-01	1.50E+00	1.83E-01	1.16E-01	7.31E-02
Dieldrin	3.32E-01	4.92E+00	1.63E+00	4.00E-01	1.33E-01	1.00E+00	3.32E-01	5.52E-05	3.46E-01	7.70E-02	1.72E-01	3.85E-01	**4.50E+00**	**2.01E+00**	8.99E-01
Endrin	2.83E-01	1.00E+00	2.83E-01	5.35E-01	1.52E-01	1.00E+00	2.83E-01	5.52E-05	6.27E-02	3.00E-01	6.71E-01	1.50E+00	2.09E-01	9.34E-02	4.18E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0025	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi =	0.950	= Proportion of diet composed of food item (aquatic invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (fish)
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)
PDS =	0.050	= Proportion of diet composed of sediment
WIR =	0.0029	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0113	= Body weight (kg)

TABLE B-6-5
Summary of Belted Kingfisher Exposure Doses - Baseline (Step 3A) - 95% UCL
Upstream Pond

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.62E+01	1.72E-01	2.80E+00	3.71E-02	6.02E-01	1.26E-01	2.05E+00	1.46E-02	2.65E-01	5.14E+00	8.12E+00	1.28E+01	5.16E-02	3.27E-02	2.07E-02
Cadmium	2.87E+00	4.10E-01	1.18E+00	5.86E-01	1.68E+00	1.64E-01	4.71E-01	4.29E-04	7.13E-02	1.45E+00	5.39E+00	2.00E+01	4.91E-02	1.32E-02	3.56E-03
Chromium	2.92E+01	1.15E-01	3.34E+00	4.10E-02	1.20E+00	3.80E-02	1.11E+00	1.55E-03	1.79E-01	1.00E+00	2.24E+00	5.00E+00	1.79E-01	7.99E-02	3.57E-02
Copper	6.18E+01	8.24E-01	5.09E+01	1.23E-01	7.60E+00	1.00E-01	6.18E+00	9.20E-03	1.62E+00	4.70E+01	5.39E+01	6.17E+01	3.46E-02	3.02E-02	2.63E-02
Lead	1.55E+02	8.24E-02	1.28E+01	3.90E-02	6.04E+00	7.00E-02	1.08E+01	2.07E-03	1.36E+00	3.85E+00	8.61E+00	1.93E+01	3.52E-01	1.58E-01	7.05E-02
Mercury	1.77E-01	1.19E+00	2.10E-01	6.52E-01	1.15E-01	3.25E+00	5.74E-01	1.00E-04	6.29E-02	2.60E-02	4.50E-02	7.80E-02	**2.42E+00**	**1.40E+00**	8.06E-01
Selenium	5.76E-01	1.00E+00	5.76E-01	5.67E-01	3.27E-01	1.00E+00	5.76E-01	2.32E-03	7.05E-02	1.80E+00	4.02E+00	9.00E+00	3.92E-02	1.75E-02	7.83E-03
Zinc	2.01E+02	8.97E-01	1.80E+02	3.58E-01	7.18E+01	1.47E-01	2.95E+01	2.76E-02	6.53E+00	1.45E+01	4.36E+01	1.31E+02	4.50E-01	1.50E-01	4.99E-02
Polychlorinated Biphenyls															
Aroclor-1254	4.91E+00	4.49E+00	2.20E+01	1.39E-01	6.84E-01	1.29E+01	6.35E+01	2.84E-04	6.93E+00	1.50E+00	3.35E+00	7.50E+00	**4.62E+00**	**2.07E+00**	9.24E-01
Aroclor-1260	3.87E-01	4.49E+00	1.74E+00	1.05E-01	4.07E-02	1.29E+01	5.01E+00	3.41E-04	5.46E-01	1.50E+00	3.35E+00	7.50E+00	3.64E-01	1.63E-01	7.28E-02
Pesticides															
4,4'-DDE	1.57E-01	2.00E+00	3.14E-01	1.09E-01	1.72E-02	2.62E+01	4.12E+00	5.52E-05	4.27E-01	3.00E-01	9.49E-01	3.00E+00	**1.42E+00**	4.50E-01	1.42E-01
4,4'-DDT	3.86E-01	1.30E+00	5.02E-01	1.35E-01	5.23E-02	8.80E+00	3.40E+00	5.52E-05	3.58E-01	3.00E-01	9.49E-01	3.00E+00	**1.19E+00**	3.77E-01	1.19E-01
Dieldrin	3.32E-01	4.92E+00	1.63E+00	4.00E-01	1.33E-01	1.00E+00	3.32E-01	5.52E-05	6.57E-02	7.70E-02	1.72E-01	3.85E-01	8.53E-01	3.82E-01	1.71E-01
Endrin	2.83E-01	1.00E+00	2.83E-01	5.35E-01	1.52E-01	1.00E+00	2.83E-01	5.52E-05	3.45E-02	3.00E-01	6.71E-01	1.50E+00	1.15E-01	5.15E-02	2.30E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0180 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.160 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.840 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of sediment
WIR = 0.0164 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.148 = Body weight (kg)

TABLE B-6-6

Summary of Great Blue Heron Exposure Doses - Baseline (Step 3A) - 95% UCL

Upstream Pond

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.62E+01	1.72E-01	2.80E+00	3.71E-02	6.02E-01	1.26E-01	2.05E+00	1.46E-02	1.16E-01	5.14E+00	8.12E+00	1.28E+01	2.25E-02	1.42E-02	9.01E-03
Cadmium	2.87E+00	4.10E-01	1.18E+00	5.86E-01	1.68E+00	1.64E-01	4.71E-01	4.29E-04	2.65E-02	1.45E+00	5.39E+00	2.00E+01	1.83E-02	4.93E-03	1.33E-03
Chromium	2.92E+01	1.15E-01	3.34E+00	4.10E-02	1.20E+00	3.80E-02	1.11E+00	1.55E-03	6.24E-02	1.00E+00	2.24E+00	5.00E+00	6.24E-02	2.79E-02	1.25E-02
Copper	6.18E+01	8.24E-01	5.09E+01	1.23E-01	7.60E+00	1.00E-01	6.18E+00	9.20E-03	3.48E-01	4.70E+01	5.39E+01	6.17E+01	7.40E-03	6.46E-03	5.64E-03
Lead	1.55E+02	8.24E-02	1.28E+01	3.90E-02	6.04E+00	7.00E-02	1.08E+01	2.07E-03	6.09E-01	3.85E+00	8.61E+00	1.93E+01	1.58E-01	7.08E-02	3.17E-02
Mercury	1.77E-01	1.19E+00	2.10E-01	6.52E-01	1.15E-01	3.25E+00	5.74E-01	1.00E-04	3.23E-02	2.60E-02	4.50E-02	7.80E-02	**1.24E+00**	7.18E-01	4.14E-01
Selenium	5.76E-01	1.00E+00	5.76E-01	5.67E-01	3.27E-01	1.00E+00	5.76E-01	2.32E-03	3.25E-02	1.80E+00	4.02E+00	9.00E+00	1.81E-02	8.08E-03	3.61E-03
Zinc	2.01E+02	8.97E-01	1.80E+02	3.58E-01	7.18E+01	1.47E-01	2.95E+01	2.76E-02	1.66E+00	1.45E+01	4.36E+01	1.31E+02	1.15E-01	3.81E-02	1.27E-02
Polychlorinated Biphenyls															
Aroclor-1254	4.91E+00	4.49E+00	2.20E+01	1.39E-01	6.84E-01	1.29E+01	6.35E+01	2.84E-04	3.57E+00	1.50E+00	3.35E+00	7.50E+00	**2.38E+00**	**1.07E+00**	4.76E-01
Aroclor-1260	3.87E-01	4.49E+00	1.74E+00	1.05E-01	4.07E-02	1.29E+01	5.01E+00	3.41E-04	2.82E-01	1.50E+00	3.35E+00	7.50E+00	1.88E-01	8.40E-02	3.76E-02
Pesticides															
4,4'-DDE	1.57E-01	2.00E+00	3.14E-01	1.09E-01	1.72E-02	2.62E+01	4.12E+00	5.52E-05	2.32E-01	3.00E-01	9.49E-01	3.00E+00	7.72E-01	2.44E-01	7.72E-02
4,4'-DDT	3.86E-01	1.30E+00	5.02E-01	1.35E-01	5.23E-02	8.80E+00	3.40E+00	5.52E-05	1.91E-01	3.00E-01	9.49E-01	3.00E+00	6.37E-01	2.02E-01	6.37E-02
Dieldrin	3.32E-01	4.92E+00	1.63E+00	4.00E-01	1.33E-01	1.00E+00	3.32E-01	5.52E-05	1.87E-02	7.70E-02	1.72E-01	3.85E-01	2.42E-01	1.08E-01	4.84E-02
Endrin	2.83E-01	1.00E+00	2.83E-01	5.35E-01	1.52E-01	1.00E+00	2.83E-01	5.52E-05	1.59E-02	3.00E-01	6.71E-01	1.50E+00	5.31E-02	2.38E-02	1.06E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.1254	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi =	0.000	= Proportion of diet composed of food item (aquatic plants)
FCxi =	Chemical-specific	= Concentration of chemical in food item (fish, dry weight basis)
PDFi =	1.000	= Proportion of diet composed of food item (fish)
SCx =	Chemical-specific	= Concentration of chemical in sediment (mg/kg, dry weight)
PDS =	0.000	= Proportion of diet composed of sediment
WIR =	0.1010	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	2.23	= Body weight (kg)

TABLE B-6-7
Summary of Mallard Exposure Doses - Baseline (Step 3A) - 95% UCL
Upstream Pond

Chemical	95% UCL Sediment Concentration (mg/kg)	Sediment-Invertebrate BAF	Aquatic Invertebrate Concentration (mg/kg dw)	Sediment-Plant BAF	Aquatic Plant Concentration (mg/kg dw)	Sediment-Fish BAF	Whole-Body Fish Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	1.62E+01	1.72E-01	2.80E+00	3.71E-02	6.02E-01	1.26E-01	2.05E+00	1.46E-02	6.49E-02	5.14E+00	8.12E+00	1.28E+01	1.26E-02	7.99E-03	5.06E-03
Cadmium	2.87E+00	4.10E-01	1.18E+00	5.86E-01	1.68E+00	1.64E-01	4.71E-01	4.29E-04	8.02E-02	1.45E+00	5.39E+00	2.00E+01	5.53E-02	1.49E-02	4.01E-03
Chromium	2.92E+01	1.15E-01	3.34E+00	4.10E-02	1.20E+00	3.80E-02	1.11E+00	1.55E-03	1.12E-01	1.00E+00	2.24E+00	5.00E+00	1.12E-01	5.00E-02	2.24E-02
Copper	6.18E+01	8.24E-01	5.09E+01	1.23E-01	7.60E+00	1.00E-01	6.18E+00	9.20E-03	6.58E-01	4.70E+01	5.39E+01	6.17E+01	1.40E-02	1.22E-02	1.07E-02
Lead	1.55E+02	8.24E-02	1.28E+01	3.90E-02	6.04E+00	7.00E-02	1.08E+01	2.07E-03	5.57E-01	1.13E+00	3.57E+00	1.13E+01	4.93E-01	1.56E-01	4.93E-02
Mercury	1.77E-01	1.19E+00	2.10E-01	6.52E-01	1.15E-01	3.25E+00	5.74E-01	1.00E-04	6.08E-03	2.60E-02	4.50E-02	7.80E-02	2.34E-01	1.35E-01	7.79E-02
Selenium	5.76E-01	1.00E+00	5.76E-01	5.67E-01	3.27E-01	1.00E+00	5.76E-01	2.32E-03	1.74E-02	4.00E-01	5.66E-01	8.00E-01	4.35E-02	3.08E-02	2.17E-02
Zinc	2.01E+02	8.97E-01	1.80E+02	3.58E-01	7.18E+01	1.47E-01	2.95E+01	2.76E-02	4.17E+00	1.45E+01	4.36E+01	1.31E+02	2.87E-01	9.56E-02	3.18E-02
Polychlorinated Biphenyls															
Aroclor-1254	4.91E+00	4.49E+00	2.20E+01	1.39E-01	6.84E-01	1.29E+01	6.35E+01	2.84E-04	1.42E-01	1.50E+00	3.35E+00	7.50E+00	9.45E-02	4.23E-02	1.89E-02
Aroclor-1260	3.87E-01	4.49E+00	1.74E+00	1.05E-01	4.07E-02	1.29E+01	5.01E+00	3.41E-04	1.06E-02	1.50E+00	3.35E+00	7.50E+00	7.10E-03	3.18E-03	1.42E-03
Pesticides															
4,4'-DDE	1.57E-01	2.00E+00	3.14E-01	1.09E-01	1.72E-02	2.62E+01	4.12E+00	5.52E-05	2.47E-03	1.20E-01	2.68E-01	6.00E-01	2.06E-02	9.21E-03	4.12E-03
4,4'-DDT	3.86E-01	1.30E+00	5.02E-01	1.35E-01	5.23E-02	8.80E+00	3.40E+00	5.52E-05	5.20E-03	6.00E-01	9.49E-01	1.50E+00	8.66E-03	5.48E-03	3.46E-03
Dieldrin	3.32E-01	4.92E+00	1.63E+00	4.00E-01	1.33E-01	1.00E+00	3.32E-01	5.52E-05	1.39E-02	7.70E-02	1.72E-01	3.85E-01	1.80E-01	8.05E-02	3.60E-02
Endrin	2.83E-01	1.00E+00	2.83E-01	5.35E-01	1.52E-01	1.00E+00	2.83E-01	5.52E-05	8.11E-03	3.00E-01	6.71E-01	1.50E+00	2.70E-02	1.21E-02	5.41E-03

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0564 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic invertebrates, dry weight basis)
PDFi = 0.100 = Proportion of diet composed of food item (aquatic invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (aquatic plants, dry weight basis)
PDFi = 0.867 = Proportion of diet composed of food item (aquatic plants)
FCxi = Chemical-specific = Concentration of chemical in food item (fish, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (fish)
SCx = Chemical-specific = Concentration of chemical in sediment (mg/kg, dry weight)
PDS = 0.033 = Proportion of diet composed of sediment
WIR = 0.0658 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 1.177 = Body weight (kg)

TABLE B-7-1
Summary of Meadow Vole Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	7.30E+00	5.23E-01	3.82E+00	1.10E+00	8.05E+00	5.80E-02	8.47E-01	2.52E-01	5.63E-01	1.26E+00	**3.36E+00**	**1.50E+00**	6.72E-01	1.60E-02	1.17E-01
Cadmium	7.00E-01	4.07E+01	2.85E+01	3.25E+00	2.28E+00	8.20E-04	2.86E-01	1.00E+00	3.16E+00	1.00E+01	2.86E-01	9.03E-02	2.86E-02	4.48E-01	3.14E-01
Chromium	5.66E+01	3.16E+00	1.79E+02	8.39E-02	4.75E+00	6.30E-03	9.82E-01	3.28E+00	7.33E+00	1.64E+01	2.99E-01	1.34E-01	5.99E-02	3.09E-01	1.75E+01
Copper	7.78E+01	1.53E+00	1.19E+02	6.25E-01	4.86E+01	2.59E-02	5.25E+00	7.80E+01	9.01E+01	1.04E+02	6.74E-02	5.83E-02	5.05E-02	1.29E+00	1.00E+02
Lead	7.93E+02	1.52E+00	1.21E+03	4.68E-01	3.71E+02	5.90E-03	4.11E+01	8.00E+00	2.53E+01	8.00E+01	**5.14E+00**	**1.63E+00**	5.14E-01	1.87E-01	1.48E+02
Mercury	1.20E-01	2.06E+01	2.48E+00	5.00E+00	6.00E-01	2.00E-04	6.48E-02	3.20E-02	7.16E-02	1.60E-01	**2.02E+00**	9.05E-01	4.05E-01	1.92E-01	2.30E-02
Nickel	3.96E+01	4.73E+00	1.87E+02	1.41E+00	5.59E+01	3.50E-03	6.01E+00	4.00E+01	5.66E+01	8.00E+01	1.50E-01	1.06E-01	7.51E-02	8.98E-01	3.56E+01
Selenium	8.40E-01	1.34E+00	1.13E+00	3.01E+00	2.53E+00	1.30E-03	2.55E-01	2.00E-01	2.57E-01	3.30E-01	**1.27E+00**	9.92E-01	7.72E-01	1.19E+00	9.97E-01
Silver	2.06E+01	1.53E+01	3.16E+02	3.67E-02	7.56E-01	7.00E-05	7.79E-01	9.06E+00	2.03E+01	4.53E+01	8.60E-02	3.84E-02	1.72E-02	7.00E-03	1.44E-01
Zinc	1.54E+02	1.29E+01	1.98E+03	1.82E+00	2.80E+02	6.54E-02	3.22E+01	1.60E+02	2.26E+02	3.20E+02	2.01E-01	1.42E-01	1.01E-01	2.32E+00	3.57E+02
Polychlorinated Biphenyls															
Aroclor-1260	9.10E-02	1.59E+01	1.45E+00	1.05E-01	9.58E-03	8.00E-04	4.52E-03	1.36E-01	3.04E-01	6.80E-01	3.32E-02	1.49E-02	6.65E-03	See footnote	4.03E-02
Pesticides															
4,4'-DDD	2.80E-01	1.12E+01	3.14E+00	2.02E-01	5.67E-02	1.30E-04	1.28E-02	8.00E-01	1.79E+00	4.00E+00	1.60E-02	7.17E-03	3.21E-03	See footnote	1.24E-01
4,4'-DDE	8.30E-02	1.12E+01	9.30E-01	1.09E-01	9.07E-03	1.30E-04	3.08E-03	8.00E-01	1.79E+00	4.00E+00	3.85E-03	1.72E-03	7.70E-04	See footnote	2.93E-02
4,4'-DDT	8.80E-02	1.12E+01	9.86E-01	1.35E-01	1.19E-02	1.30E-04	3.49E-03	8.00E-01	1.79E+00	4.00E+00	4.36E-03	1.95E-03	8.73E-04	See footnote	3.32E-02
alpha-Chlordane	9.90E-04	4.00E+00	3.96E-03	1.65E-01	1.63E-04	6.70E-05	5.65E-05	4.58E+00	6.48E+00	9.16E+00	1.23E-05	8.73E-06	6.17E-06	See footnote	2.59E-04
delta-BHC	1.40E-01	1.00E+00	1.40E-01	1.31E+00	1.84E-01	6.70E-05	1.88E-02	1.60E+00	2.26E+00	3.20E+00	1.17E-02	8.31E-03	5.87E-03	See footnote	1.82E-01
Dieldrin	6.50E-01	1.47E+01	9.56E+00	4.00E-01	2.60E-01	1.30E-04	4.71E-02	4.00E-02	8.94E-02	2.00E-01	**1.18E+00**	5.27E-01	2.36E-01	See footnote	4.55E-01
Endosulfan I	2.20E+00	1.00E+00	2.20E+00	1.69E+00	3.71E+00	6.70E-05	3.77E-01	1.50E-01	3.35E-01	7.50E-01	**2.51E+00**	**1.12E+00**	5.02E-01	See footnote	3.65E+00
Endrin	1.30E-01	3.60E+00	4.68E-01	5.35E-01	6.95E-02	1.30E-04	8.21E-03	1.84E-01	4.11E-01	9.20E-01	4.46E-02	2.00E-02	8.93E-03	See footnote	7.89E-02
gamma-BHC (Lindane)	8.60E-01	2.66E+01	2.29E+01	1.85E+00	1.59E+00	6.70E-05	2.07E-01	8.00E+00	1.79E+01	4.00E+01	2.59E-02	1.16E-02	5.17E-03	See footnote	2.00E+00
Semivolatile Organics															
Acenaphthene	2.40E+01	3.00E-01	7.20E+00	1.55E+00	3.72E+01	6.90E-05	3.75E+00	3.50E+02	4.95E+02	7.00E+02	1.07E-02	7.58E-03	5.36E-03	0.00E+00	0.00E+00
Acenaphthylene	4.10E+00	2.20E-01	9.02E-01	1.31E+00	5.38E+00	2.00E-04	5.43E-01	3.50E+02	4.95E+02	7.00E+02	1.55E-03	1.10E-03	7.76E-04	0.00E+00	0.00E+00
Anthracene	1.40E+02	3.20E-01	4.48E+01	8.61E-01	1.21E+02	2.00E-04	1.23E+01	1.00E+03	2.24E+03	5.00E+03	1.23E-02	5.52E-03	2.47E-03	0.00E+00	0.00E+00
Benzo(a)anthracene	1.80E+02	2.70E-01	4.86E+01	2.94E-01	5.29E+01	3.40E-04	5.78E+00	2.00E+00	4.47E+00	1.00E+01	**2.89E+00**	**1.29E+00**	5.78E-01	0.00E+00	0.00E+00
Benzo(a)pyrene	1.30E+02	3.40E-01	4.42E+01	2.01E-01	2.61E+01	2.40E-04	2.99E+00	2.00E+00	4.47E+00	1.00E+01	**1.49E+00**	6.68E-01	2.99E-01	0.00E+00	0.00E+00
Benzo(b)fluoranthene	2.00E+02	2.10E-01	4.20E+01	3.10E-01	6.20E+01	5.80E-04	6.71E+00	2.00E+00	4.47E+00	1.00E+01	**3.35E+00**	**1.50E+00**	6.71E-01	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	6.60E+01	1.50E-01	9.90E+00	1.16E-01	7.63E+00	1.60E-04	9.38E-01	2.00E+00	4.47E+00	1.00E+01	4.69E-01	2.10E-01	9.38E-02	0.00E+00	0.00E+00
Benzo(k)fluoranthene	8.10E+01	2.10E-01	1.70E+01	1.84E-01	1.49E+01	1.50E-04	1.71E+00	2.00E+00	4.47E+00	1.00E+01	8.56E-01	3.83E-01	1.71E-01	0.00E+00	0.00E+00
Chrysene	2.10E+02	4.40E-01	9.24E+01	2.94E-01	6.18E+01	8.00E-05	6.81E+00	2.00E+00	4.47E+00	1.00E+01	**3.41E+00**	**1.52E+00**	6.81E-01	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	2.20E+01	4.90E-01	1.08E+01	1.30E-01	2.86E+00	2.00E-04	3.59E-01	2.00E+00	4.47E+00	1.00E+01	1.80E-01	8.04E-02	3.59E-02	0.00E+00	0.00E+00
Fluoranthene	5.00E+02	3.70E-01	1.85E+02	5.00E-01	2.50E+02	3.20E-04	2.63E+01	5.00E+02	1.12E+03	2.50E+03	5.26E-02	2.35E-02	1.05E-02	0.00E+00	0.00E+00
Fluorene	4.00E+01	2.00E-01	8.00E+00	1.18E+00	4.73E+01	2.00E-04	4.79E+00	5.00E+02	1.12E+03	2.50E+03	9.58E-03	4.28E-03	1.92E-03	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	6.90E+01	4.10E-01	2.83E+01	1.10E-01	7.59E+00	2.40E-04	9.79E-01	2.00E+00	4.47E+00	1.00E+01	4.90E-01	2.19E-01	9.79E-02	0.00E+00	0.00E+00
Phenanthrene	4.70E+02	2.80E-01	1.32E+02	8.61E-01	4.05E+02	8.80E-05	4.14E+01	5.00E+02	1.12E+03	2.50E+03	8.28E-02	3.70E-02	1.66E-02	0.00E+00	0.00E+00

TABLE B-7-1
Summary of Meadow Vole Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Pyrene	3.90E+02	3.90E-01	1.52E+02	7.20E-01	2.81E+02	2.90E-04	2.90E+01	2.00E+00	4.47E+00	1.00E+01	**1.45E+01**	**6.49E+00**	**2.90E+00**	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0031 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.020 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.956 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.024 = Proportion of diet composed of soil
WIR = 0.0133 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0300 = Body weight (kg)

TABLE B-7-2
Summary of Short-tailed Shrew Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	7.30E+00	5.23E-01	3.82E+00	1.10E+00	8.05E+00	5.80E-02	6.54E-01	2.52E-01	5.63E-01	1.26E+00	**2.60E+00**	**1.16E+00**	5.19E-01	1.49E-02	1.09E-01
Cadmium	7.00E-01	4.07E+01	2.85E+01	3.25E+00	2.28E+00	8.20E-04	3.35E+00	1.00E+00	3.16E+00	1.00E+01	**3.35E+00**	**1.06E+00**	3.35E-01	7.02E+00	4.91E+00
Chromium	5.66E+01	3.16E+00	1.79E+02	8.39E-02	4.75E+00	6.30E-03	2.19E+01	3.28E+00	7.33E+00	1.64E+01	**6.69E+00**	**2.99E+00**	**1.34E+00**	3.33E-01	1.89E+01
Copper	7.78E+01	1.53E+00	1.19E+02	6.25E-01	4.86E+01	2.59E-02	1.57E+01	7.80E+01	9.01E+01	1.04E+02	2.01E-01	1.74E-01	1.51E-01	1.12E+00	8.69E+01
Lead	7.93E+02	1.52E+00	1.21E+03	4.68E-01	3.71E+02	5.90E-03	1.58E+02	8.00E+00	2.53E+01	8.00E+01	**1.97E+01**	**6.24E+00**	**1.97E+00**	3.39E-01	2.69E+02
Mercury	1.20E-01	2.06E+01	2.48E+00	5.00E+00	6.00E-01	2.00E-04	2.95E-01	3.20E-02	7.16E-02	1.60E-01	**9.22E+00**	**4.12E+00**	**1.84E+00**	1.92E-01	2.30E-02
Nickel	3.96E+01	4.73E+00	1.87E+02	1.41E+00	5.59E+01	3.50E-03	2.29E+01	4.00E+01	5.66E+01	8.00E+01	5.74E-01	4.06E-01	2.87E-01	5.78E-01	2.29E+01
Selenium	8.40E-01	1.34E+00	1.13E+00	3.01E+00	2.53E+00	1.30E-03	1.64E-01	2.00E-01	2.57E-01	3.30E-01	8.20E-01	6.39E-01	4.97E-01	1.19E+00	9.97E-01
Silver	2.06E+01	1.53E+01	3.16E+02	3.67E-02	7.56E-01	7.00E-05	3.72E+01	9.06E+00	2.03E+01	4.53E+01	**4.11E+00**	**1.84E+00**	8.22E-01	5.01E-01	1.03E+01
Zinc	1.54E+02	1.29E+01	1.98E+03	1.82E+00	2.80E+02	6.54E-02	2.36E+02	1.60E+02	2.26E+02	3.20E+02	**1.48E+00**	**1.04E+00**	7.38E-01	2.90E+00	4.47E+02
Polychlorinated Biphenyls															
Aroclor-1260	9.10E-02	1.59E+01	1.45E+00	1.05E-01	9.58E-03	8.00E-04	1.71E-01	1.36E-01	3.04E-01	6.80E-01	**1.26E+00**	5.62E-01	2.51E-01	See footnote	1.20E+00
Pesticides															
4,4'-DDD	2.80E-01	1.12E+01	3.14E+00	2.02E-01	5.67E-02	1.30E-04	3.71E-01	8.00E-01	1.79E+00	4.00E+00	4.64E-01	2.08E-01	9.28E-02	See footnote	2.62E+00
4,4'-DDE	8.30E-02	1.12E+01	9.30E-01	1.09E-01	9.07E-03	1.30E-04	1.10E-01	8.00E-01	1.79E+00	4.00E+00	1.38E-01	6.15E-02	2.75E-02	See footnote	7.76E-01
4,4'-DDT	8.80E-02	1.12E+01	9.86E-01	1.35E-01	1.19E-02	1.30E-04	1.17E-01	8.00E-01	1.79E+00	4.00E+00	1.46E-01	6.52E-02	2.92E-02	See footnote	8.23E-01
alpha-Chlordane	9.90E-04	4.00E+00	3.96E-03	1.65E-01	1.63E-04	6.70E-05	5.05E-04	4.58E+00	6.48E+00	9.16E+00	1.10E-04	7.80E-05	5.51E-05	See footnote	3.40E-03
delta-BHC	1.40E-01	1.00E+00	1.40E-01	1.31E+00	1.84E-01	6.70E-05	2.02E-02	1.60E+00	2.26E+00	3.20E+00	1.26E-02	8.91E-03	6.30E-03	See footnote	1.42E-01
Dieldrin	6.50E-01	1.47E+01	9.56E+00	4.00E-01	2.60E-01	1.30E-04	1.13E+00	4.00E-02	8.94E-02	2.00E-01	**2.82E+01**	**1.26E+01**	**5.64E+00**	See footnote	7.96E+00
Endosulfan I	2.20E+00	1.00E+00	2.20E+00	1.69E+00	3.71E+00	6.70E-05	3.22E-01	1.50E-01	3.35E-01	7.50E-01	**2.15E+00**	9.59E-01	4.29E-01	See footnote	2.27E+00
Endrin	1.30E-01	3.60E+00	4.68E-01	5.35E-01	6.95E-02	1.30E-04	5.75E-02	1.84E-01	4.11E-01	9.20E-01	3.12E-01	1.40E-01	6.25E-02	See footnote	4.05E-01
gamma-BHC (Lindane)	8.60E-01	2.66E+01	2.29E+01	1.85E+00	1.59E+00	6.70E-05	2.69E+00	8.00E+00	1.79E+01	4.00E+01	3.37E-01	1.51E-01	6.74E-02	See footnote	1.90E+01
Semivolatile Organics															
Acenaphthene	2.40E+01	3.00E-01	7.20E+00	1.55E+00	3.72E+01	6.90E-05	1.53E+00	3.50E+02	4.95E+02	7.00E+02	4.37E-03	3.09E-03	2.19E-03	0.00E+00	0.00E+00
Acenaphthylene	4.10E+00	2.20E-01	9.02E-01	1.31E+00	5.38E+00	2.00E-04	2.17E-01	3.50E+02	4.95E+02	7.00E+02	6.19E-04	4.38E-04	3.09E-04	0.00E+00	0.00E+00
Anthracene	1.40E+02	3.20E-01	4.48E+01	8.61E-01	1.21E+02	2.00E-04	8.61E+00	1.00E+03	2.24E+03	5.00E+03	8.61E-03	3.85E-03	1.72E-03	0.00E+00	0.00E+00
Benzo(a)anthracene	1.80E+02	2.70E-01	4.86E+01	2.94E-01	5.29E+01	3.40E-04	9.34E+00	2.00E+00	4.47E+00	1.00E+01	**4.67E+00**	**2.09E+00**	9.34E-01	0.00E+00	0.00E+00
Benzo(a)pyrene	1.30E+02	3.40E-01	4.42E+01	2.01E-01	2.61E+01	2.40E-04	7.72E+00	2.00E+00	4.47E+00	1.00E+01	**3.86E+00**	**1.73E+00**	7.72E-01	0.00E+00	0.00E+00
Benzo(b)fluoranthene	2.00E+02	2.10E-01	4.20E+01	3.10E-01	6.20E+01	5.80E-04	8.99E+00	2.00E+00	4.47E+00	1.00E+01	**4.50E+00**	**2.01E+00**	8.99E-01	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	6.60E+01	1.50E-01	9.90E+00	1.16E-01	7.63E+00	1.60E-04	2.42E+00	2.00E+00	4.47E+00	1.00E+01	**1.21E+00**	5.41E-01	2.42E-01	0.00E+00	0.00E+00
Benzo(k)fluoranthene	8.10E+01	2.10E-01	1.70E+01	1.84E-01	1.49E+01	1.50E-04	3.58E+00	2.00E+00	4.47E+00	1.00E+01	**1.79E+00**	7.99E-01	3.58E-01	0.00E+00	0.00E+00
Chrysene	2.10E+02	4.40E-01	9.24E+01	2.94E-01	6.18E+01	8.00E-05	1.51E+01	2.00E+00	4.47E+00	1.00E+01	**7.53E+00**	**3.37E+00**	**1.51E+00**	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	2.20E+01	4.90E-01	1.08E+01	1.30E-01	2.86E+00	2.00E-04	1.68E+00	2.00E+00	4.47E+00	1.00E+01	8.41E-01	3.76E-01	1.68E-01	0.00E+00	0.00E+00
Fluoranthene	5.00E+02	3.70E-01	1.85E+02	5.00E-01	2.50E+02	3.20E-04	3.24E+01	5.00E+02	1.12E+03	2.50E+03	6.49E-02	2.90E-02	1.30E-02	0.00E+00	0.00E+00
Fluorene	4.00E+01	2.00E-01	8.00E+00	1.18E+00	4.73E+01	2.00E-04	1.98E+00	5.00E+02	1.12E+03	2.50E+03	3.97E-03	1.78E-03	7.94E-04	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	6.90E+01	4.10E-01	2.83E+01	1.10E-01	7.59E+00	2.40E-04	4.62E+00	2.00E+00	4.47E+00	1.00E+01	**2.31E+00**	**1.03E+00**	4.62E-01	0.00E+00	0.00E+00
Phenanthrene	4.70E+02	2.80E-01	1.32E+02	8.61E-01	4.05E+02	8.80E-05	2.67E+01	5.00E+02	1.12E+03	2.50E+03	5.34E-02	2.39E-02	1.07E-02	0.00E+00	0.00E+00

TABLE B-7-2
Summary of Short-tailed Shrew Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Pyrene	3.90E+02	3.90E-01	1.52E+02	7.20E-01	2.81E+02	2.90E-04	2.68E+01	2.00E+00	4.47E+00	1.00E+01	**1.34E+01**	**5.99E+00**	**2.68E+00**	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0019	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.823	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.047	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.130	= Proportion of diet composed of soil
WIR =	0.0048	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.01331	= Body weight (kg)

TABLE B-7-3
Summary of White-footed Mouse Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	7.30E+00	5.23E-01	3.82E+00	1.10E+00	8.05E+00	5.80E-02	3.51E-01	2.52E-01	5.63E-01	1.26E+00	**1.39E+00**	6.24E-01	2.79E-01	1.40E-02	1.02E-01
Cadmium	7.00E-01	4.07E+01	2.85E+01	3.25E+00	2.28E+00	8.20E-04	7.56E-01	1.00E+00	3.16E+00	1.00E+01	7.56E-01	2.39E-01	7.56E-02	4.62E-01	3.23E-01
Chromium	5.66E+01	3.16E+00	1.79E+02	8.39E-02	4.75E+00	6.30E-03	4.55E+00	3.28E+00	7.33E+00	1.64E+01	**1.39E+00**	6.21E-01	2.78E-01	3.49E-01	1.98E+01
Copper	7.78E+01	1.53E+00	1.19E+02	6.25E-01	4.86E+01	2.59E-02	4.29E+00	7.80E+01	9.01E+01	1.04E+02	5.50E-02	4.76E-02	4.13E-02	5.54E-01	4.31E+01
Lead	7.93E+02	1.52E+00	1.21E+03	4.68E-01	3.71E+02	5.90E-03	4.01E+01	8.00E+00	2.53E+01	8.00E+01	**5.01E+00**	**1.58E+00**	5.01E-01	2.86E-01	2.27E+02
Mercury	1.20E-01	2.06E+01	2.48E+00	5.00E+00	6.00E-01	2.00E-04	7.65E-02	3.20E-02	7.16E-02	1.60E-01	**2.39E+00**	**1.07E+00**	4.78E-01	1.30E-01	1.56E-02
Nickel	3.96E+01	4.73E+00	1.87E+02	1.41E+00	5.59E+01	3.50E-03	6.09E+00	4.00E+01	5.66E+01	8.00E+01	1.52E-01	1.08E-01	7.61E-02	5.89E-01	2.33E+01
Selenium	8.40E-01	1.34E+00	1.13E+00	3.01E+00	2.53E+00	1.30E-03	9.61E-02	2.00E-01	2.57E-01	3.30E-01	4.81E-01	3.74E-01	2.91E-01	1.26E+00	1.06E+00
Silver	2.06E+01	1.53E+01	3.16E+02	3.67E-02	7.56E-01	7.00E-05	7.75E+00	9.06E+00	2.03E+01	4.53E+01	8.55E-01	3.82E-01	1.71E-01	8.10E-01	1.67E+01
Zinc	1.54E+02	1.29E+01	1.98E+03	1.82E+00	2.80E+02	6.54E-02	5.60E+01	1.60E+02	2.26E+02	3.20E+02	3.50E-01	2.48E-01	1.75E-01	2.78E+00	4.28E+02
Polychlorinated Biphenyls															
Aroclor-1260	9.10E-02	1.59E+01	1.45E+00	1.05E-01	9.58E-03	8.00E-04	3.62E-02	1.36E-01	3.04E-01	6.80E-01	2.66E-01	1.19E-01	5.32E-02	See footnote	6.87E-01
Pesticides															
4,4'-DDD	2.80E-01	1.12E+01	3.14E+00	2.02E-01	5.67E-02	1.30E-04	7.84E-02	8.00E-01	1.79E+00	4.00E+00	9.80E-02	4.38E-02	1.96E-02	See footnote	1.51E+00
4,4'-DDE	8.30E-02	1.12E+01	9.30E-01	1.09E-01	9.07E-03	1.30E-04	2.31E-02	8.00E-01	1.79E+00	4.00E+00	2.89E-02	1.29E-02	5.77E-03	See footnote	4.43E-01
4,4'-DDT	8.80E-02	1.12E+01	9.86E-01	1.35E-01	1.19E-02	1.30E-04	2.45E-02	8.00E-01	1.79E+00	4.00E+00	3.07E-02	1.37E-02	6.13E-03	See footnote	4.71E-01
alpha-Chlordane	9.90E-04	4.00E+00	3.96E-03	1.65E-01	1.63E-04	6.70E-05	1.45E-04	4.58E+00	6.48E+00	9.16E+00	3.18E-05	2.25E-05	1.59E-05	See footnote	1.96E-03
delta-BHC	1.40E-01	1.00E+00	1.40E-01	1.31E+00	1.84E-01	6.70E-05	8.46E-03	1.60E+00	2.26E+00	3.20E+00	5.29E-03	3.74E-03	2.64E-03	See footnote	1.62E-01
Dieldrin	6.50E-01	1.47E+01	9.56E+00	4.00E-01	2.60E-01	1.30E-04	2.41E-01	4.00E-02	8.94E-02	2.00E-01	**6.02E+00**	**2.69E+00**	**1.20E+00**	See footnote	4.64E+00
Endosulfan I	2.20E+00	1.00E+00	2.20E+00	1.69E+00	3.71E+00	6.70E-05	1.54E-01	1.50E-01	3.35E-01	7.50E-01	**1.03E+00**	4.60E-01	2.06E-01	See footnote	2.97E+00
Endrin	1.30E-01	3.60E+00	4.68E-01	5.35E-01	6.95E-02	1.30E-04	1.35E-02	1.84E-01	4.11E-01	9.20E-01	7.32E-02	3.28E-02	1.46E-02	See footnote	2.58E-01
gamma-BHC (Lindane)	8.60E-01	2.66E+01	2.29E+01	1.85E+00	1.59E+00	6.70E-05	6.01E-01	8.00E+00	1.79E+01	4.00E+01	7.51E-02	3.36E-02	1.50E-02	See footnote	1.16E+01
Semivolatile Organics															
Acenaphthene	2.40E+01	3.00E-01	7.20E+00	1.55E+00	3.72E+01	6.90E-05	1.19E+00	3.50E+02	4.95E+02	7.00E+02	3.39E-03	2.40E-03	1.69E-03	0.00E+00	0.00E+00
Acenaphthylene	4.10E+00	2.20E-01	9.02E-01	1.31E+00	5.38E+00	2.00E-04	1.69E-01	3.50E+02	4.95E+02	7.00E+02	4.82E-04	3.41E-04	2.41E-04	0.00E+00	0.00E+00
Anthracene	1.40E+02	3.20E-01	4.48E+01	8.61E-01	1.21E+02	2.00E-04	4.43E+00	1.00E+03	2.24E+03	5.00E+03	4.43E-03	1.98E-03	8.86E-04	0.00E+00	0.00E+00
Benzo(a)anthracene	1.80E+02	2.70E-01	4.86E+01	2.94E-01	5.29E+01	3.40E-04	2.77E+00	2.00E+00	4.47E+00	1.00E+01	**1.39E+00**	6.20E-01	2.77E-01	0.00E+00	0.00E+00
Benzo(a)pyrene	1.30E+02	3.40E-01	4.42E+01	2.01E-01	2.61E+01	2.40E-04	1.90E+00	2.00E+00	4.47E+00	1.00E+01	9.52E-01	4.26E-01	1.90E-01	0.00E+00	0.00E+00
Benzo(b)fluoranthene	2.00E+02	2.10E-01	4.20E+01	3.10E-01	6.20E+01	5.80E-04	2.87E+00	2.00E+00	4.47E+00	1.00E+01	**1.44E+00**	6.43E-01	2.87E-01	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	6.60E+01	1.50E-01	9.90E+00	1.16E-01	7.63E+00	1.60E-04	5.12E-01	2.00E+00	4.47E+00	1.00E+01	2.56E-01	1.14E-01	5.12E-02	0.00E+00	0.00E+00
Benzo(k)fluoranthene	8.10E+01	2.10E-01	1.70E+01	1.84E-01	1.49E+01	1.50E-04	8.94E-01	2.00E+00	4.47E+00	1.00E+01	4.47E-01	2.00E-01	8.94E-02	0.00E+00	0.00E+00
Chrysene	2.10E+02	4.40E-01	9.24E+01	2.94E-01	6.18E+01	8.00E-05	4.11E+00	2.00E+00	4.47E+00	1.00E+01	**2.05E+00**	9.18E-01	4.11E-01	0.00E+00	0.00E+00
Dibenz(a,h)anthracene	2.20E+01	4.90E-01	1.08E+01	1.30E-01	2.86E+00	2.00E-04	3.62E-01	2.00E+00	4.47E+00	1.00E+01	1.81E-01	8.09E-02	3.62E-02	0.00E+00	0.00E+00
Fluoranthene	5.00E+02	3.70E-01	1.85E+02	5.00E-01	2.50E+02	3.20E-04	1.16E+01	5.00E+02	1.12E+03	2.50E+03	2.33E-02	1.04E-02	4.66E-03	0.00E+00	0.00E+00
Fluorene	4.00E+01	2.00E-01	8.00E+00	1.18E+00	4.73E+01	2.00E-04	1.49E+00	5.00E+02	1.12E+03	2.50E+03	2.98E-03	1.33E-03	5.96E-04	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	6.90E+01	4.10E-01	2.83E+01	1.10E-01	7.59E+00	2.40E-04	9.63E-01	2.00E+00	4.47E+00	1.00E+01	4.81E-01	2.15E-01	9.63E-02	0.00E+00	0.00E+00
Phenanthrene	4.70E+02	2.80E-01	1.32E+02	8.61E-01	4.05E+02	8.80E-05	1.44E+01	5.00E+02	1.12E+03	2.50E+03	2.88E-02	1.29E-02	5.76E-03	0.00E+00	0.00E+00

TABLE B-7-3
Summary of White-footed Mouse Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Pyrene	3.90E+02	3.90E-01	1.52E+02	7.20E-01	2.81E+02	2.90E-04	1.15E+01	2.00E+00	4.47E+00	1.00E+01	**5.77E+00**	**2.58E+00**	**1.15E+00**	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0007 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.470 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.510 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.020 = Proportion of diet composed of soil
WIR = 0.0092 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0141 = Body weight (kg)

TABLE B-7-4
Summary of Red Fox Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	7.30E+00	5.23E-01	3.82E+00	1.10E+00	8.05E+00	See footenote	1.09E-01	5.80E-02	5.27E-02	1.20E+00	2.68E+00	6.00E+00	4.39E-02	1.96E-02	8.79E-03
Cadmium	7.00E-01	4.07E+01	2.85E+01	3.25E+00	2.28E+00	See footenote	1.85E+00	8.20E-04	1.21E-01	7.50E-01	1.68E+00	3.75E+00	1.61E-01	7.21E-02	3.22E-02
Chromium	5.66E+01	3.16E+00	1.79E+02	8.39E-02	4.75E+00	See footenote	1.87E+01	6.30E-03	1.08E+00	3.28E+00	7.33E+00	1.64E+01	3.31E-01	1.48E-01	6.61E-02
Copper	7.78E+01	1.53E+00	1.19E+02	6.25E-01	4.86E+01	See footenote	7.68E+01	2.59E-02	3.54E+00	1.17E+01	1.33E+01	1.51E+01	3.03E-01	2.66E-01	2.34E-01
Lead	7.93E+02	1.52E+00	1.21E+03	4.68E-01	3.71E+02	See footenote	2.15E+02	5.90E-03	1.26E+01	8.00E+00	2.53E+01	8.00E+01	**1.57E+00**	4.96E-01	1.57E-01
Mercury	1.20E-01	2.06E+01	2.48E+00	5.00E+00	6.00E-01	See footenote	2.06E-02	2.00E-04	6.20E-03	1.50E-01	1.94E-01	2.50E-01	4.14E-02	3.20E-02	2.48E-02
Nickel	3.96E+01	4.73E+00	1.87E+02	1.41E+00	5.59E+01	See footenote	2.73E+01	3.50E-03	1.59E+00	2.50E+01	3.95E+01	6.25E+01	6.35E-02	4.02E-02	2.54E-02
Selenium	8.40E-01	1.34E+00	1.13E+00	3.01E+00	2.53E+00	See footenote	1.02E+00	1.30E-03	5.24E-02	2.00E-01	2.57E-01	3.30E-01	2.62E-01	2.04E-01	1.59E-01
Silver	2.06E+01	1.53E+01	3.16E+02	3.67E-02	7.56E-01	See footenote	9.05E+00	7.00E-05	8.10E-01	9.06E+00	2.03E+01	4.53E+01	8.94E-02	4.00E-02	1.79E-02
Zinc	1.54E+02	1.29E+01	1.98E+03	1.82E+00	2.80E+02	See footenote	4.11E+02	6.54E-02	2.04E+01	2.08E+01	4.65E+01	1.04E+02	9.82E-01	4.39E-01	1.96E-01
Polychlorinated Biphenyls															
Aroclor-1260	9.10E-02	1.59E+01	1.45E+00	1.05E-01	9.58E-03	See footenote	6.44E-01	8.00E-04	2.83E-02	1.40E-01	3.11E-01	6.90E-01	2.02E-01	9.12E-02	4.11E-02
Pesticides															
4,4'-DDD	2.80E-01	1.12E+01	3.14E+00	2.02E-01	5.67E-02	See footenote	1.42E+00	1.30E-04	6.23E-02	1.00E+00	2.24E+00	5.00E+00	6.23E-02	2.79E-02	1.25E-02
4,4'-DDE	8.30E-02	1.12E+01	9.30E-01	1.09E-01	9.07E-03	See footenote	4.16E-01	1.30E-04	1.83E-02	1.00E+00	2.24E+00	5.00E+00	1.83E-02	8.19E-03	3.66E-03
4,4'-DDT	8.80E-02	1.12E+01	9.86E-01	1.35E-01	1.19E-02	See footenote	4.42E-01	1.30E-04	1.95E-02	1.00E+00	2.24E+00	5.00E+00	1.95E-02	8.71E-03	3.89E-03
alpha-Chlordane	9.90E-04	4.00E+00	3.96E-03	1.65E-01	1.63E-04	See footenote	1.87E-03	6.70E-05	9.19E-05	4.58E+00	6.48E+00	9.16E+00	2.01E-05	1.42E-05	1.00E-05
delta-BHC	1.40E-01	1.00E+00	1.40E-01	1.31E+00	1.84E-01	See footenote	1.62E-01	6.70E-05	7.56E-03	1.60E+00	2.26E+00	3.20E+00	4.73E-03	3.34E-03	2.36E-03
Dieldrin	6.50E-01	1.47E+01	9.56E+00	4.00E-01	2.60E-01	See footenote	4.35E+00	1.30E-04	1.91E-01	2.80E-02	6.26E-02	1.40E-01	**6.83E+00**	**3.05E+00**	**1.37E+00**
Endosulfan I	2.20E+00	1.00E+00	2.20E+00	1.69E+00	3.71E+00	See footenote	2.96E+00	6.70E-05	1.38E-01	1.00E+00	2.24E+00	5.00E+00	1.38E-01	6.19E-02	2.77E-02
Endrin	1.30E-01	3.60E+00	4.68E-01	5.35E-01	6.95E-02	See footenote	2.47E-01	1.30E-04	1.11E-02	1.84E-01	4.11E-01	9.20E-01	6.03E-02	2.70E-02	1.21E-02
gamma-BHC (Lindane)	8.60E-01	2.66E+01	2.29E+01	1.85E+00	1.59E+00	See footenote	1.09E+01	6.70E-05	4.78E-01	8.00E+00	1.79E+01	4.00E+01	5.98E-02	2.67E-02	1.20E-02
Semivolatile Organics															
Acenaphthene	2.40E+01	3.00E-01	7.20E+00	1.55E+00	3.72E+01	See footenote	0.00E+00	6.90E-05	1.62E-01	3.50E+02	4.95E+02	7.00E+02	4.63E-04	3.27E-04	2.32E-04
Acenaphthylene	4.10E+00	2.20E-01	9.02E-01	1.31E+00	5.38E+00	See footenote	0.00E+00	2.00E-04	2.41E-02	3.50E+02	4.95E+02	7.00E+02	6.88E-05	4.86E-05	3.44E-05
Anthracene	1.40E+02	3.20E-01	4.48E+01	8.61E-01	1.21E+02	See footenote	0.00E+00	2.00E-04	6.34E-01	1.00E+03	2.24E+03	5.00E+03	6.34E-04	2.84E-04	1.27E-04
Benzo(a)anthracene	1.80E+02	2.70E-01	4.86E+01	2.94E-01	5.29E+01	See footenote	0.00E+00	3.40E-04	4.71E-01	2.00E+00	4.47E+00	1.00E+01	2.35E-01	1.05E-01	4.71E-02
Benzo(a)pyrene	1.30E+02	3.40E-01	4.42E+01	2.01E-01	2.61E+01	See footenote	0.00E+00	2.40E-04	3.12E-01	2.00E+00	4.47E+00	1.00E+01	1.56E-01	6.98E-02	3.12E-02
Benzo(b)fluoranthene	2.00E+02	2.10E-01	4.20E+01	3.10E-01	6.20E+01	See footenote	0.00E+00	5.80E-04	5.18E-01	2.00E+00	4.47E+00	1.00E+01	2.59E-01	1.16E-01	5.18E-02
Benzo(g,h,i)perylene	6.60E+01	1.50E-01	9.90E+00	1.16E-01	7.63E+00	See footenote	0.00E+00	1.60E-04	1.24E-01	2.00E+00	4.47E+00	1.00E+01	6.19E-02	2.77E-02	1.24E-02
Benzo(k)fluoranthene	8.10E+01	2.10E-01	1.70E+01	1.84E-01	1.49E+01	See footenote	0.00E+00	1.50E-04	1.77E-01	2.00E+00	4.47E+00	1.00E+01	8.83E-02	3.95E-02	1.77E-02
Chrysene	2.10E+02	4.40E-01	9.24E+01	2.94E-01	6.18E+01	See footenote	0.00E+00	8.00E-05	5.96E-01	2.00E+00	4.47E+00	1.00E+01	2.98E-01	1.33E-01	5.96E-02
Dibenz(a,h)anthracene	2.20E+01	4.90E-01	1.08E+01	1.30E-01	2.86E+00	See footenote	0.00E+00	2.00E-04	5.21E-02	2.00E+00	4.47E+00	1.00E+01	2.60E-02	1.16E-02	5.21E-03
Fluoranthene	5.00E+02	3.70E-01	1.85E+02	5.00E-01	2.50E+02	See footenote	0.00E+00	3.20E-04	1.71E+00	5.00E+02	1.12E+03	2.50E+03	3.42E-03	1.53E-03	6.83E-04
Fluorene	4.00E+01	2.00E-01	8.00E+00	1.18E+00	4.73E+01	See footenote	0.00E+00	2.00E-04	2.17E-01	5.00E+02	1.12E+03	2.50E+03	4.34E-04	1.94E-04	8.68E-05
Indeno(1,2,3-cd)pyrene	6.90E+01	4.10E-01	2.83E+01	1.10E-01	7.59E+00	See footenote	0.00E+00	2.40E-04	1.52E-01	2.00E+00	4.47E+00	1.00E+01	7.58E-02	3.39E-02	1.52E-02
Phenanthrene	4.70E+02	2.80E-01	1.32E+02	8.61E-01	4.05E+02	See footenote	0.00E+00	8.80E-05	2.10E+00	5.00E+02	1.12E+03	2.50E+03	4.21E-03	1.88E-03	8.42E-04

TABLE B-7-4
Summary of Red Fox Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Pyrene	3.90E+02	3.90E-01	1.52E+02	7.20E-01	2.81E+02	See footenote	0.00E+00	2.90E-04	1.62E+00	2.00E+00	4.47E+00	1.00E+01	8.11E-01	3.63E-01	1.62E-01

Assumes equal proportions of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1476 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.028 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 0.874 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.028 = Proportion of diet composed of soil
WIR = 0.4115 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 3.17 = Body weight (kg)

TABLE B-7-5
Summary of American Robin Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Arsenic	7.30E+00	5.23E-01	3.82E+00	1.10E+00	8.05E+00	5.80E-02	7.28E-01	2.46E+00	4.26E+00	7.38E+00	2.96E-01	1.71E-01	9.86E-02
Cadmium	7.00E-01	4.07E+01	2.85E+01	3.25E+00	2.28E+00	8.20E-04	1.58E+00	1.45E+00	5.39E+00	2.00E+01	**1.09E+00**	2.93E-01	7.88E-02
Chromium	5.66E+01	3.16E+00	1.79E+02	8.39E-02	4.75E+00	6.30E-03	9.61E+00	1.00E+00	2.24E+00	5.00E+00	**9.61E+00**	**4.30E+00**	**1.92E+00**
Copper	7.78E+01	1.53E+00	1.19E+02	6.25E-01	4.86E+01	2.59E-02	9.35E+00	4.70E+01	5.39E+01	6.17E+01	1.99E-01	1.74E-01	1.52E-01
Lead	7.93E+02	1.52E+00	1.21E+03	4.68E-01	3.71E+02	5.90E-03	8.74E+01	3.85E+00	8.61E+00	1.93E+01	**2.27E+01**	**1.02E+01**	**4.54E+00**
Mercury	1.20E-01	2.06E+01	2.48E+00	5.00E+00	6.00E-01	2.00E-04	1.62E-01	4.90E-01	7.67E-01	1.20E+00	3.30E-01	2.11E-01	1.35E-01
Nickel	3.96E+01	4.73E+00	1.87E+02	1.41E+00	5.59E+01	3.50E-03	1.30E+01	7.74E+01	9.10E+01	1.07E+02	1.68E-01	1.43E-01	1.22E-01
Selenium	8.40E-01	1.34E+00	1.13E+00	3.01E+00	2.53E+00	1.30E-03	2.14E-01	4.40E-01	6.80E-01	1.05E+00	4.86E-01	3.14E-01	2.04E-01
Silver	2.06E+01	1.53E+01	3.16E+02	3.67E-02	7.56E-01	7.00E-05	1.61E+01	7.00E+00	1.57E+01	3.50E+01	**2.30E+00**	**1.03E+00**	4.60E-01
Zinc	1.54E+02	1.29E+01	1.98E+03	1.82E+00	2.80E+02	6.54E-02	1.18E+02	1.45E+01	4.36E+01	1.31E+02	**8.12E+00**	**2.70E+00**	8.99E-01
Polychlorinated Biphenyls													
Aroclor-1260	9.10E-02	1.59E+01	1.45E+00	1.05E-01	9.58E-03	8.00E-04	7.42E-02	4.10E-01	9.17E-01	2.05E+00	1.81E-01	8.10E-02	3.62E-02
Pesticides													
4,4'-DDD	2.80E-01	1.12E+01	3.14E+00	2.02E-01	5.67E-02	1.30E-04	1.63E-01	5.00E-01	1.58E+00	5.00E+00	3.26E-01	1.03E-01	3.26E-02
4,4'-DDE	8.30E-02	1.12E+01	9.30E-01	1.09E-01	9.07E-03	1.30E-04	4.79E-02	5.00E-01	1.58E+00	5.00E+00	9.58E-02	3.03E-02	9.58E-03
4,4'-DDT	8.80E-02	1.12E+01	9.86E-01	1.35E-01	1.19E-02	1.30E-04	5.09E-02	5.00E-01	1.58E+00	5.00E+00	1.02E-01	3.22E-02	1.02E-02
alpha-Chlordane	9.90E-04	4.00E+00	3.96E-03	1.65E-01	1.63E-04	6.70E-05	2.28E-04	2.14E+00	4.79E+00	1.07E+01	1.07E-04	4.77E-05	2.13E-05
delta-BHC	1.40E-01	1.00E+00	1.40E-01	1.31E+00	1.84E-01	6.70E-05	1.89E-02	5.60E-01	1.12E+00	2.25E+00	3.37E-02	1.68E-02	8.38E-03
Dieldrin	6.50E-01	1.47E+01	9.56E+00	4.00E-01	2.60E-01	1.30E-04	5.01E-01	7.70E-02	1.72E-01	3.85E-01	**6.51E+00**	**2.91E+00**	**1.30E+00**
Endosulfan I	2.20E+00	1.00E+00	2.20E+00	1.69E+00	3.71E+00	6.70E-05	3.46E-01	1.00E+01	2.24E+01	5.00E+01	3.46E-02	1.55E-02	6.92E-03
Endrin	1.30E-01	3.60E+00	4.68E-01	5.35E-01	6.95E-02	1.30E-04	2.85E-02	2.00E-02	4.47E-02	1.00E-01	**1.42E+00**	6.37E-01	2.85E-01
gamma-BHC (Lindane)	8.60E-01	2.66E+01	2.29E+01	1.85E+00	1.59E+00	6.70E-05	1.25E+00	4.00E+00	8.94E+00	2.00E+01	3.13E-01	1.40E-01	6.27E-02
Semivolatile Organics													
Acenaphthene	2.40E+01	3.00E-01	7.20E+00	1.55E+00	3.72E+01	6.90E-05	2.73E+00	7.10E+00	1.59E+01	3.55E+01	3.85E-01	1.72E-01	7.69E-02
Acenaphthylene	4.10E+00	2.20E-01	9.02E-01	1.31E+00	5.38E+00	2.00E-04	3.91E-01	7.10E+00	1.59E+01	3.55E+01	5.50E-02	2.46E-02	1.10E-02
Anthracene	1.40E+02	3.20E-01	4.48E+01	8.61E-01	1.21E+02	2.00E-04	1.03E+01	7.10E+00	1.59E+01	3.55E+01	**1.44E+00**	6.46E-01	2.89E-01
Benzo(a)anthracene	1.80E+02	2.70E-01	4.86E+01	2.94E-01	5.29E+01	3.40E-04	6.59E+00	7.10E+00	1.59E+01	3.55E+01	9.29E-01	4.15E-01	1.86E-01
Benzo(a)pyrene	1.30E+02	3.40E-01	4.42E+01	2.01E-01	2.61E+01	2.40E-04	4.49E+00	7.10E+00	1.59E+01	3.55E+01	6.32E-01	2.83E-01	1.26E-01
Benzo(b)fluoranthene	2.00E+02	2.10E-01	4.20E+01	3.10E-01	6.20E+01	5.80E-04	6.91E+00	7.10E+00	1.59E+01	3.55E+01	9.74E-01	4.35E-01	1.95E-01
Benzo(g,h,i)perylene	6.60E+01	1.50E-01	9.90E+00	1.16E-01	7.63E+00	1.60E-04	1.31E+00	7.10E+00	1.59E+01	3.55E+01	1.84E-01	8.25E-02	3.69E-02
Benzo(k)fluoranthene	8.10E+01	2.10E-01	1.70E+01	1.84E-01	1.49E+01	1.50E-04	2.19E+00	7.10E+00	1.59E+01	3.55E+01	3.08E-01	1.38E-01	6.16E-02
Chrysene	2.10E+02	4.40E-01	9.24E+01	2.94E-01	6.18E+01	8.00E-05	9.49E+00	7.10E+00	1.59E+01	3.55E+01	**1.34E+00**	5.98E-01	2.67E-01
Dibenz(a,h)anthracene	2.20E+01	4.90E-01	1.08E+01	1.30E-01	2.86E+00	2.00E-04	8.33E-01	7.10E+00	1.59E+01	3.55E+01	1.17E-01	5.25E-02	2.35E-02
Fluoranthene	5.00E+02	3.70E-01	1.85E+02	5.00E-01	2.50E+02	3.20E-04	2.70E+01	7.10E+00	1.59E+01	3.55E+01	**3.81E+00**	**1.70E+00**	7.61E-01
Fluorene	4.00E+01	2.00E-01	8.00E+00	1.18E+00	4.73E+01	2.00E-04	3.46E+00	7.10E+00	1.59E+01	3.55E+01	4.88E-01	2.18E-01	9.76E-02
Indeno(1,2,3-cd)pyrene	6.90E+01	4.10E-01	2.83E+01	1.10E-01	7.59E+00	2.40E-04	2.25E+00	7.10E+00	1.59E+01	3.55E+01	3.17E-01	1.42E-01	6.34E-02
Phenanthrene	4.70E+02	2.80E-01	1.32E+02	8.61E-01	4.05E+02	8.80E-05	3.35E+01	7.10E+00	1.59E+01	3.55E+01	**4.72E+00**	**2.11E+00**	9.43E-01

TABLE B-7-5
Summary of American Robin Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Pyrene	3.90E+02	3.90E-01	1.52E+02	7.20E-01	2.81E+02	2.90E-04	2.66E+01	7.10E+00	1.59E+01	3.55E+01	**3.75E+00**	**1.68E+00**	7.50E-01

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0074	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.435	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.519	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.046	= Proportion of diet composed of soil
WIR =	0.0129	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0635	= Body weight (kg)

TABLE B-7-6
Summary of Red-tailed Hawk Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	7.30E+00	5.23E-01	3.82E+00	1.10E+00	8.05E+00	See footenote	1.09E-01	5.80E-02	8.63E-03	2.46E+00	4.26E+00	7.38E+00	3.51E-03	2.03E-03	1.17E-03
Cadmium	7.00E-01	4.07E+01	2.85E+01	3.25E+00	2.28E+00	See footenote	1.85E+00	8.20E-04	7.64E-02	1.45E+00	5.39E+00	2.00E+01	5.27E-02	1.42E-02	3.82E-03
Chromium	5.66E+01	3.16E+00	1.79E+02	8.39E-02	4.75E+00	See footenote	1.87E+01	6.30E-03	7.73E-01	1.00E+00	2.24E+00	5.00E+00	7.73E-01	3.46E-01	1.55E-01
Copper	7.78E+01	1.53E+00	1.19E+02	6.25E-01	4.86E+01	See footenote	7.68E+01	2.59E-02	3.17E+00	4.70E+01	5.39E+01	6.17E+01	6.75E-02	5.89E-02	5.14E-02
Lead	7.93E+02	1.52E+00	1.21E+03	4.68E-01	3.71E+02	See footenote	2.15E+02	5.90E-03	8.86E+00	3.85E+00	8.61E+00	1.93E+01	**2.30E+00**	**1.03E+00**	4.60E-01
Mercury	1.20E-01	2.06E+01	2.48E+00	5.00E+00	6.00E-01	See footenote	2.06E-02	2.00E-04	8.63E-04	4.90E-01	7.67E-01	1.20E+00	1.76E-03	1.13E-03	7.19E-04
Nickel	3.96E+01	4.73E+00	1.87E+02	1.41E+00	5.59E+01	See footenote	2.73E+01	3.50E-03	1.13E+00	7.74E+01	9.10E+01	1.07E+02	1.45E-02	1.24E-02	1.05E-02
Selenium	8.40E-01	1.34E+00	1.13E+00	3.01E+00	2.53E+00	See footenote	1.02E+00	1.30E-03	4.21E-02	4.40E-01	6.80E-01	1.05E+00	9.58E-02	6.20E-02	4.01E-02
Silver	2.06E+01	1.53E+01	3.16E+02	3.67E-02	7.56E-01	See footenote	9.05E+00	7.00E-05	3.74E-01	7.00E+00	1.57E+01	3.50E+01	5.34E-02	2.39E-02	1.07E-02
Zinc	1.54E+02	1.29E+01	1.98E+03	1.82E+00	2.80E+02	See footenote	4.11E+02	6.54E-02	1.70E+01	1.45E+01	4.36E+01	1.31E+02	**1.17E+00**	3.89E-01	1.29E-01
Polychlorinated Biphenyls															
Aroclor-1260	9.10E-02	1.59E+01	1.45E+00	1.05E-01	9.58E-03	See footenote	6.44E-01	8.00E-04	2.66E-02	4.10E-01	9.17E-01	2.05E+00	6.50E-02	2.91E-02	1.30E-02
Pesticides															
4,4'-DDD	2.80E-01	1.12E+01	3.14E+00	2.02E-01	5.67E-02	See footenote	1.42E+00	1.30E-04	5.85E-02	8.00E-02	1.79E-01	4.00E-01	7.32E-01	3.27E-01	1.46E-01
4,4'-DDE	8.30E-02	1.12E+01	9.30E-01	1.09E-01	9.07E-03	See footenote	4.16E-01	1.30E-04	1.72E-02	8.00E-02	1.79E-01	4.00E-01	2.15E-01	9.61E-02	4.30E-02
4,4'-DDT	8.80E-02	1.12E+01	9.86E-01	1.35E-01	1.19E-02	See footenote	4.42E-01	1.30E-04	1.83E-02	8.00E-02	1.79E-01	4.00E-01	2.29E-01	1.02E-01	4.57E-02
alpha-Chlordane	9.90E-04	4.00E+00	3.96E-03	1.65E-01	1.63E-04	See footenote	1.87E-03	6.70E-05	8.21E-05	2.14E+00	4.79E+00	1.07E+01	3.84E-05	1.72E-05	7.67E-06
delta-BHC	1.40E-01	1.00E+00	1.40E-01	1.31E+00	1.84E-01	See footenote	1.62E-01	6.70E-05	6.69E-03	5.60E-01	1.12E+00	2.25E+00	1.20E-02	5.96E-03	2.97E-03
Dieldrin	6.50E-01	1.47E+01	9.56E+00	4.00E-01	2.60E-01	See footenote	4.35E+00	1.30E-04	1.80E-01	7.70E-02	1.72E-01	3.85E-01	**2.33E+00**	**1.04E+00**	4.67E-01
Endosulfan I	2.20E+00	1.00E+00	2.20E+00	1.69E+00	3.71E+00	See footenote	2.96E+00	6.70E-05	1.22E-01	1.00E+01	2.24E+01	5.00E+01	1.22E-02	5.47E-03	2.45E-03
Endrin	1.30E-01	3.60E+00	4.68E-01	5.35E-01	6.95E-02	See footenote	2.47E-01	1.30E-04	1.02E-02	2.00E-02	4.47E-02	1.00E-01	5.11E-01	2.29E-01	1.02E-01
gamma-BHC (Lindane)	8.60E-01	2.66E+01	2.29E+01	1.85E+00	1.59E+00	See footenote	1.09E+01	6.70E-05	4.49E-01	4.00E+00	8.94E+00	2.00E+01	1.12E-01	5.02E-02	2.24E-02
Semivolatile Organics															
Acenaphthene	2.40E+01	3.00E-01	7.20E+00	1.55E+00	3.72E+01	See footenote	0.00E+00	6.90E-05	4.90E-06	7.10E+00	1.59E+01	3.55E+01	6.90E-07	3.09E-07	1.38E-07
Acenaphthylene	4.10E+00	2.20E-01	9.02E-01	1.31E+00	5.38E+00	See footenote	0.00E+00	2.00E-04	1.42E-05	7.10E+00	1.59E+01	3.55E+01	2.00E-06	8.95E-07	4.00E-07
Anthracene	1.40E+02	3.20E-01	4.48E+01	8.61E-01	1.21E+02	See footenote	0.00E+00	2.00E-04	1.42E-05	7.10E+00	1.59E+01	3.55E+01	2.00E-06	8.95E-07	4.00E-07
Benzo(a)anthracene	1.80E+02	2.70E-01	4.86E+01	2.94E-01	5.29E+01	See footenote	0.00E+00	3.40E-04	2.41E-05	7.10E+00	1.59E+01	3.55E+01	3.40E-06	1.52E-06	6.80E-07
Benzo(a)pyrene	1.30E+02	3.40E-01	4.42E+01	2.01E-01	2.61E+01	See footenote	0.00E+00	2.40E-04	1.70E-05	7.10E+00	1.59E+01	3.55E+01	2.40E-06	1.07E-06	4.80E-07
Benzo(b)fluoranthene	2.00E+02	2.10E-01	4.20E+01	3.10E-01	6.20E+01	See footenote	0.00E+00	5.80E-04	4.12E-05	7.10E+00	1.59E+01	3.55E+01	5.80E-06	2.59E-06	1.16E-06
Benzo(g,h,i)perylene	6.60E+01	1.50E-01	9.90E+00	1.16E-01	7.63E+00	See footenote	0.00E+00	1.60E-04	1.14E-05	7.10E+00	1.59E+01	3.55E+01	1.60E-06	7.16E-07	3.20E-07
Benzo(k)fluoranthene	8.10E+01	2.10E-01	1.70E+01	1.84E-01	1.49E+01	See footenote	0.00E+00	1.50E-04	1.07E-05	7.10E+00	1.59E+01	3.55E+01	1.50E-06	6.71E-07	3.00E-07
Chrysene	2.10E+02	4.40E-01	9.24E+01	2.94E-01	6.18E+01	See footenote	0.00E+00	8.00E-05	5.68E-06	7.10E+00	1.59E+01	3.55E+01	8.00E-07	3.58E-07	1.60E-07
Dibenz(a,h)anthracene	2.20E+01	4.90E-01	1.08E+01	1.30E-01	2.86E+00	See footenote	0.00E+00	2.00E-04	1.42E-05	7.10E+00	1.59E+01	3.55E+01	2.00E-06	8.95E-07	4.00E-07
Fluoranthene	5.00E+02	3.70E-01	1.85E+02	5.00E-01	2.50E+02	See footenote	0.00E+00	3.20E-04	2.27E-05	7.10E+00	1.59E+01	3.55E+01	3.20E-06	1.43E-06	6.40E-07
Fluorene	4.00E+01	2.00E-01	8.00E+00	1.18E+00	4.73E+01	See footenote	0.00E+00	2.00E-04	1.42E-05	7.10E+00	1.59E+01	3.55E+01	2.00E-06	8.95E-07	4.00E-07
Indeno(1,2,3-cd)pyrene	6.90E+01	4.10E-01	2.83E+01	1.10E-01	7.59E+00	See footenote	0.00E+00	2.40E-04	1.70E-05	7.10E+00	1.59E+01	3.55E+01	2.40E-06	1.07E-06	4.80E-07
Phenanthrene	4.70E+02	2.80E-01	1.32E+02	8.61E-01	4.05E+02	See footenote	0.00E+00	8.80E-05	6.25E-06	7.10E+00	1.59E+01	3.55E+01	8.80E-07	3.94E-07	1.76E-07

TABLE B-7-6
Summary of Red-tailed Hawk Exposure Doses - Screening (Step 2)
AOC 3

Chemical	Maximum Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Maximum Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Pyrene	3.90E+02	3.90E-01	1.52E+02	7.20E-01	2.81E+02	See footenote	0.00E+00	2.90E-04	2.06E-05	7.10E+00	1.59E+01	3.55E+01	2.90E-06	1.30E-06	5.80E-07

Assumes equal proportionss of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0395 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
WIR = 0.0680 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.957 = Body weight (kg)

TABLE B-8-1
Summary of Meadow Vole Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
AOC 3

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.13E+00	2.58E-01	8.07E-01	3.71E-02	1.16E-01	6.88E-03	1.13E-02	2.52E-01	5.63E-01	1.26E+00	4.49E-02	2.01E-02	8.97E-03	5.42E-03	1.69E-02
Cadmium	2.73E-01	7.66E+00	2.09E+00	5.86E-01	1.60E-01	3.24E-04	9.90E-03	1.00E+00	3.16E+00	1.00E+01	9.90E-03	3.13E-03	9.90E-04	1.34E-01	3.66E-02
Chromium	1.90E+01	3.20E-01	6.09E+00	4.10E-02	7.79E-01	1.20E-03	6.48E-02	3.28E+00	7.33E+00	1.64E+01	1.98E-02	8.84E-03	3.95E-03	8.84E-02	1.68E+00
Lead	9.71E+01	3.07E-01	2.98E+01	3.90E-02	3.79E+00	1.30E-03	3.20E-01	8.00E+00	2.53E+01	8.00E+01	4.00E-02	1.26E-02	4.00E-03	4.06E-02	3.94E+00
Mercury	3.89E-02	1.19E+00	4.61E-02	6.52E-01	2.53E-02	1.00E-04	1.29E-03	3.20E-02	7.16E-02	1.60E-01	4.04E-02	1.81E-02	8.09E-03	6.72E-02	2.61E-03
Selenium	3.92E-01	9.82E-01	3.85E-01	5.67E-01	2.22E-01	1.96E-03	1.16E-02	2.00E-01	2.57E-01	3.30E-01	5.81E-02	4.52E-02	3.52E-02	2.73E-01	1.07E-01
Silver	2.42E+00	2.05E+00	4.96E+00	1.40E-02	3.39E-02	3.65E-04	9.34E-03	9.06E+00	2.03E+01	4.53E+01	1.03E-03	4.61E-04	2.06E-04	5.68E-03	1.38E-02
Zinc	5.60E+01	2.48E+00	1.39E+02	3.58E-01	2.00E+01	2.00E-02	1.14E+00	1.60E+02	2.26E+02	3.20E+02	7.12E-03	5.04E-03	3.56E-03	2.93E-01	1.64E+01
Polychlorinated Biphenyls															
Aroclor-1260	1.74E-02	4.30E+00	7.46E-02	1.05E-01	1.83E-03	3.20E-04	2.46E-04	1.36E-01	3.04E-01	6.80E-01	1.81E-03	8.08E-04	3.61E-04	See footnote	3.66E-03
Pesticides															
Dieldrin	6.07E-02	1.47E+01	8.93E-01	4.00E-01	2.43E-02	5.17E-05	2.09E-03	4.00E-02	8.94E-02	2.00E-01	5.22E-02	2.33E-02	1.04E-02	See footnote	4.25E-02
Endosulfan I	2.01E-01	1.00E+00	2.01E-01	1.69E+00	3.39E-01	2.60E-05	1.63E-02	1.50E-01	3.35E-01	7.50E-01	1.08E-01	4.85E-02	2.17E-02	See footnote	3.33E-01
Endrin	2.18E-02	3.60E+00	7.85E-02	5.35E-01	1.17E-02	5.17E-05	6.57E-04	1.84E-01	4.11E-01	9.20E-01	3.57E-03	1.60E-03	7.14E-04	See footnote	1.32E-02
Semivolatile Organics															
Anthracene	1.30E+01	3.20E-01	4.15E+00	8.61E-01	1.12E+01	9.54E-05	5.40E-01	1.00E+03	2.24E+03	5.00E+03	5.40E-04	2.41E-04	1.08E-04	0.00E+00	0.00E+00
Benzo(a)anthracene	1.76E+01	2.70E-01	4.74E+00	2.94E-01	5.16E+00	9.73E-05	2.66E-01	2.00E+00	4.47E+00	1.00E+01	1.33E-01	5.95E-02	2.66E-02	0.00E+00	0.00E+00
Benzo(a)pyrene	1.28E+01	3.40E-01	4.34E+00	2.01E-01	2.56E+00	1.05E-04	1.39E-01	2.00E+00	4.47E+00	1.00E+01	6.93E-02	3.10E-02	1.39E-02	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.93E+01	2.10E-01	4.05E+00	3.10E-01	5.98E+00	1.11E-04	3.06E-01	2.00E+00	4.47E+00	1.00E+01	1.53E-01	6.83E-02	3.06E-02	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	7.04E+00	1.50E-01	1.06E+00	1.16E-01	8.14E-01	1.00E-04	4.73E-02	2.00E+00	4.47E+00	1.00E+01	2.36E-02	1.06E-02	4.73E-03	0.00E+00	0.00E+00
Benzo(k)fluoranthene	8.13E+00	2.10E-01	1.71E+00	1.84E-01	1.50E+00	9.76E-05	8.12E-02	2.00E+00	4.47E+00	1.00E+01	4.06E-02	1.82E-02	8.12E-03	0.00E+00	0.00E+00
Chrysene	2.03E+01	4.40E-01	8.91E+00	2.94E-01	5.96E+00	9.42E-05	3.11E-01	2.00E+00	4.47E+00	1.00E+01	1.55E-01	6.94E-02	3.11E-02	0.00E+00	0.00E+00
Fluoranthene	4.76E+01	3.70E-01	1.76E+01	5.00E-01	2.38E+01	1.23E-04	1.18E+00	5.00E+02	1.12E+03	2.50E+03	2.37E-03	1.06E-03	4.73E-04	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	6.79E+00	4.10E-01	2.78E+00	1.10E-01	7.47E-01	1.07E-04	4.56E-02	2.00E+00	4.47E+00	1.00E+01	2.28E-02	1.02E-02	4.56E-03	0.00E+00	0.00E+00
Phenanthrene	4.38E+01	2.80E-01	1.23E+01	8.61E-01	3.77E+01	8.92E-05	1.82E+00	5.00E+02	1.12E+03	2.50E+03	3.64E-03	1.63E-03	7.29E-04	0.00E+00	0.00E+00
Pyrene	3.72E+01	3.90E-01	1.45E+01	7.20E-01	2.68E+01	1.34E-04	1.31E+00	2.00E+00	4.47E+00	1.00E+01	6.54E-01	2.92E-01	1.31E-01	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0021	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.020	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.956	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.024	= Proportion of diet composed of soil
WIR =	0.0090	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0428	= Body weight (kg)

TABLE B-8-2
Summary of Short-tailed Shrew Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
AOC 3

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.13E+00	2.58E-01	8.07E-01	3.71E-02	1.16E-01	6.88E-03	9.68E-02	2.52E-01	5.63E-01	1.26E+00	3.84E-01	1.72E-01	7.68E-02	3.87E-03	1.21E-02
Cadmium	2.73E-01	7.66E+00	2.09E+00	5.86E-01	1.60E-01	3.24E-04	1.56E-01	1.00E+00	3.16E+00	1.00E+01	1.56E-01	4.94E-02	1.56E-02	2.21E+00	6.04E-01
Chromium	1.90E+01	3.20E-01	6.09E+00	4.10E-02	7.79E-01	1.20E-03	6.65E-01	3.28E+00	7.33E+00	1.64E+01	2.03E-01	9.07E-02	4.06E-02	8.50E-02	1.62E+00
Lead	9.71E+01	3.07E-01	2.98E+01	3.90E-02	3.79E+00	1.30E-03	3.30E+00	8.00E+00	2.53E+01	8.00E+01	4.13E-01	1.31E-01	4.13E-02	1.48E-01	1.43E+01
Mercury	3.89E-02	1.19E+00	4.61E-02	6.52E-01	2.53E-02	1.00E-04	3.93E-03	3.20E-02	7.16E-02	1.60E-01	1.23E-01	5.50E-02	2.46E-02	6.72E-02	2.61E-03
Selenium	3.92E-01	9.82E-01	3.85E-01	5.67E-01	2.22E-01	1.96E-03	3.39E-02	2.00E-01	2.57E-01	3.30E-01	1.69E-01	1.32E-01	1.03E-01	2.73E-01	1.07E-01
Silver	2.42E+00	2.05E+00	4.96E+00	1.40E-02	3.39E-02	3.65E-04	3.89E-01	9.06E+00	2.03E+01	4.53E+01	4.29E-02	1.92E-02	8.59E-03	3.56E-02	8.63E-02
Zinc	5.60E+01	2.48E+00	1.39E+02	3.58E-01	2.00E+01	2.00E-02	1.08E+01	1.60E+02	2.26E+02	3.20E+02	6.78E-02	4.79E-02	3.39E-02	8.62E-01	4.82E+01
Polychlorinated Biphenyls															
Aroclor-1260	1.74E-02	4.30E+00	7.46E-02	1.05E-01	1.83E-03	3.20E-04	5.71E-03	1.36E-01	3.04E-01	6.80E-01	4.20E-02	1.88E-02	8.40E-03	See footnote	6.38E-02
Pesticides															
Dieldrin	6.07E-02	1.47E+01	8.93E-01	4.00E-01	2.43E-02	5.17E-05	6.58E-02	4.00E-02	8.94E-02	2.00E-01	**1.65E+00**	7.36E-01	3.29E-01	See footnote	7.44E-01
Endosulfan I	2.01E-01	1.00E+00	2.01E-01	1.69E+00	3.39E-01	2.60E-05	1.84E-02	1.50E-01	3.35E-01	7.50E-01	1.22E-01	5.47E-02	2.45E-02	See footnote	2.07E-01
Endrin	2.18E-02	3.60E+00	7.85E-02	5.35E-01	1.17E-02	5.17E-05	6.03E-03	1.84E-01	4.11E-01	9.20E-01	3.28E-02	1.47E-02	6.55E-03	See footnote	6.80E-02
Semivolatile Organics															
Anthracene	1.30E+01	3.20E-01	4.15E+00	8.61E-01	1.12E+01	9.54E-05	4.97E-01	1.00E+03	2.24E+03	5.00E+03	4.97E-04	2.22E-04	9.95E-05	0.00E+00	0.00E+00
Benzo(a)anthracene	1.76E+01	2.70E-01	4.74E+00	2.94E-01	5.16E+00	9.73E-05	5.69E-01	2.00E+00	4.47E+00	1.00E+01	2.84E-01	1.27E-01	5.69E-02	0.00E+00	0.00E+00
Benzo(a)pyrene	1.28E+01	3.40E-01	4.34E+00	2.01E-01	2.56E+00	1.05E-04	4.73E-01	2.00E+00	4.47E+00	1.00E+01	2.37E-01	1.06E-01	4.73E-02	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.93E+01	2.10E-01	4.05E+00	3.10E-01	5.98E+00	1.11E-04	5.42E-01	2.00E+00	4.47E+00	1.00E+01	2.71E-01	1.21E-01	5.42E-02	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	7.04E+00	1.50E-01	1.06E+00	1.16E-01	8.14E-01	1.00E-04	1.61E-01	2.00E+00	4.47E+00	1.00E+01	8.07E-02	3.61E-02	1.61E-02	0.00E+00	0.00E+00
Benzo(k)fluoranthene	8.13E+00	2.10E-01	1.71E+00	1.84E-01	1.50E+00	9.76E-05	2.24E-01	2.00E+00	4.47E+00	1.00E+01	1.12E-01	5.01E-02	2.24E-02	0.00E+00	0.00E+00
Chrysene	2.03E+01	4.40E-01	8.91E+00	2.94E-01	5.96E+00	9.42E-05	9.07E-01	2.00E+00	4.47E+00	1.00E+01	4.54E-01	2.03E-01	9.07E-02	0.00E+00	0.00E+00
Fluoranthene	4.76E+01	3.70E-01	1.76E+01	5.00E-01	2.38E+01	1.23E-04	1.93E+00	5.00E+02	1.12E+03	2.50E+03	3.86E-03	1.72E-03	7.71E-04	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	6.79E+00	4.10E-01	2.78E+00	1.10E-01	7.47E-01	1.07E-04	2.84E-01	2.00E+00	4.47E+00	1.00E+01	1.42E-01	6.35E-02	2.84E-02	0.00E+00	0.00E+00
Phenanthrene	4.38E+01	2.80E-01	1.23E+01	8.61E-01	3.77E+01	8.92E-05	1.55E+00	5.00E+02	1.12E+03	2.50E+03	3.11E-03	1.39E-03	6.21E-04	0.00E+00	0.00E+00
Pyrene	3.72E+01	3.90E-01	1.45E+01	7.20E-01	2.68E+01	1.34E-04	1.60E+00	2.00E+00	4.47E+00	1.00E+01	7.98E-01	3.57E-01	1.60E-01	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0015 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.823 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.047 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.130 = Proportion of diet composed of soil
WIR = 0.0038 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.01687 = Body weight (kg)

TABLE B-8-3
Summary of White-footed Mouse Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
AOC 3

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	3.13E+00	2.58E-01	8.07E-01	3.71E-02	1.16E-01	6.88E-03	1.41E-02	2.52E-01	5.63E-01	1.26E+00	5.59E-02	2.50E-02	1.12E-02	3.26E-03	1.02E-02
Cadmium	2.73E-01	7.66E+00	2.09E+00	5.86E-01	1.60E-01	3.24E-04	2.58E-02	1.00E+00	3.16E+00	1.00E+01	2.58E-02	8.15E-03	2.58E-03	1.44E-01	3.93E-02
Chromium	1.90E+01	3.20E-01	6.09E+00	4.10E-02	7.79E-01	1.20E-03	8.76E-02	3.28E+00	7.33E+00	1.64E+01	2.67E-02	1.20E-02	5.34E-03	7.00E-02	1.33E+00
Lead	9.71E+01	3.07E-01	2.98E+01	3.90E-02	3.79E+00	1.30E-03	4.29E-01	8.00E+00	2.53E+01	8.00E+01	5.37E-02	1.70E-02	5.37E-03	5.48E-02	5.32E+00
Mercury	3.89E-02	1.19E+00	4.61E-02	6.52E-01	2.53E-02	1.00E-04	8.79E-04	3.20E-02	7.16E-02	1.60E-01	2.75E-02	1.23E-02	5.49E-03	5.43E-02	2.11E-03
Selenium	3.92E-01	9.82E-01	3.85E-01	5.67E-01	2.22E-01	1.96E-03	7.84E-03	2.00E-01	2.57E-01	3.30E-01	3.92E-02	3.05E-02	2.37E-02	2.58E-01	1.01E-01
Silver	2.42E+00	2.05E+00	4.96E+00	1.40E-02	3.39E-02	3.65E-04	5.76E-02	9.06E+00	2.03E+01	4.53E+01	6.36E-03	2.84E-03	1.27E-03	1.51E-01	3.67E-01
Zinc	5.60E+01	2.48E+00	1.39E+02	3.58E-01	2.00E+01	2.00E-02	1.84E+00	1.60E+02	2.26E+02	3.20E+02	1.15E-02	8.15E-03	5.76E-03	5.09E-01	2.85E+01
Polychlorinated Biphenyls															
Aroclor-1260	1.74E-02	4.30E+00	7.46E-02	1.05E-01	1.83E-03	3.20E-04	9.68E-04	1.36E-01	3.04E-01	6.80E-01	7.12E-03	3.18E-03	1.42E-03	See footnote	3.63E-02
Pesticides															
Dieldrin	6.07E-02	1.47E+01	8.93E-01	4.00E-01	2.43E-02	5.17E-05	1.04E-02	4.00E-02	8.94E-02	2.00E-01	2.60E-01	1.16E-01	5.20E-02	See footnote	4.33E-01
Endosulfan I	2.01E-01	1.00E+00	2.01E-01	1.69E+00	3.39E-01	2.60E-05	6.52E-03	1.50E-01	3.35E-01	7.50E-01	4.34E-02	1.94E-02	8.69E-03	See footnote	2.71E-01
Endrin	2.18E-02	3.60E+00	7.85E-02	5.35E-01	1.17E-02	5.17E-05	1.05E-03	1.84E-01	4.11E-01	9.20E-01	5.73E-03	2.56E-03	1.15E-03	See footnote	4.33E-02
Semivolatile Organics															
Anthracene	1.30E+01	3.20E-01	4.15E+00	8.61E-01	1.12E+01	9.54E-05	1.90E-01	1.00E+03	2.24E+03	5.00E+03	1.90E-04	8.48E-05	3.79E-05	0.00E+00	0.00E+00
Benzo(a)anthracene	1.76E+01	2.70E-01	4.74E+00	2.94E-01	5.16E+00	9.73E-05	1.25E-01	2.00E+00	4.47E+00	1.00E+01	6.25E-02	2.80E-02	1.25E-02	0.00E+00	0.00E+00
Benzo(a)pyrene	1.28E+01	3.40E-01	4.34E+00	2.01E-01	2.56E+00	1.05E-04	8.63E-02	2.00E+00	4.47E+00	1.00E+01	4.32E-02	1.93E-02	8.63E-03	0.00E+00	0.00E+00
Benzo(b)fluoranthene	1.93E+01	2.10E-01	4.05E+00	3.10E-01	5.98E+00	1.11E-04	1.28E-01	2.00E+00	4.47E+00	1.00E+01	6.40E-02	2.86E-02	1.28E-02	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	7.04E+00	1.50E-01	1.06E+00	1.16E-01	8.14E-01	1.00E-04	2.53E-02	2.00E+00	4.47E+00	1.00E+01	1.26E-02	5.65E-03	2.53E-03	0.00E+00	0.00E+00
Benzo(k)fluoranthene	8.13E+00	2.10E-01	1.71E+00	1.84E-01	1.50E+00	9.76E-05	4.15E-02	2.00E+00	4.47E+00	1.00E+01	2.08E-02	9.29E-03	4.15E-03	0.00E+00	0.00E+00
Chrysene	2.03E+01	4.40E-01	8.91E+00	2.94E-01	5.96E+00	9.42E-05	1.83E-01	2.00E+00	4.47E+00	1.00E+01	9.16E-02	4.10E-02	1.83E-02	0.00E+00	0.00E+00
Fluoranthene	4.76E+01	3.70E-01	1.76E+01	5.00E-01	2.38E+01	1.23E-04	5.12E-01	5.00E+02	1.12E+03	2.50E+03	1.02E-03	4.58E-04	2.05E-04	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	6.79E+00	4.10E-01	2.78E+00	1.10E-01	7.47E-01	1.07E-04	4.38E-02	2.00E+00	4.47E+00	1.00E+01	2.19E-02	9.80E-03	4.38E-03	0.00E+00	0.00E+00
Phenanthrene	4.38E+01	2.80E-01	1.23E+01	8.61E-01	3.77E+01	8.92E-05	6.20E-01	5.00E+02	1.12E+03	2.50E+03	1.24E-03	5.55E-04	2.48E-04	0.00E+00	0.00E+00
Pyrene	3.72E+01	3.90E-01	1.45E+01	7.20E-01	2.68E+01	1.34E-04	5.09E-01	2.00E+00	4.47E+00	1.00E+01	2.55E-01	1.14E-01	5.09E-02	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0005	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.470	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.510	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.020	= Proportion of diet composed of soil
WIR =	0.0062	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0208	= Body weight (kg)

TABLE B-8-4

Summary of Red Fox Exposure Doses - Baseline (Step 3A) - Arithmetic Mean

AOC 3

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	3.13E+00	2.58E-01	8.07E-01	3.71E-02	1.16E-01	See footenote	1.31E-02	6.88E-03	4.52E-03	1.20E+00	2.68E+00	6.00E+00	3.77E-03	1.69E-03	7.54E-04
Cadmium	2.73E-01	7.66E+00	2.09E+00	5.86E-01	1.60E-01	See footenote	2.27E-01	3.24E-04	8.38E-03	7.50E-01	1.68E+00	3.75E+00	1.12E-02	5.00E-03	2.24E-03
Chromium	1.90E+01	3.20E-01	6.09E+00	4.10E-02	7.79E-01	See footenote	1.54E+00	1.20E-03	6.39E-02	3.28E+00	7.33E+00	1.64E+01	1.95E-02	8.72E-03	3.90E-03
Lead	9.71E+01	3.07E-01	2.98E+01	3.90E-02	3.79E+00	See footenote	7.87E+00	1.30E-03	3.24E-01	8.00E+00	2.53E+01	8.00E+01	4.06E-02	1.28E-02	4.06E-03
Mercury	3.89E-02	1.19E+00	4.61E-02	6.52E-01	2.53E-02	See footenote	2.44E-03	1.00E-04	1.99E-04	1.50E-01	1.94E-01	2.50E-01	1.33E-03	1.03E-03	7.97E-04
Selenium	3.92E-01	9.82E-01	3.85E-01	5.67E-01	2.22E-01	See footenote	1.05E-01	1.96E-03	4.08E-03	2.00E-01	2.57E-01	3.30E-01	2.04E-02	1.59E-02	1.24E-02
Silver	2.42E+00	2.05E+00	4.96E+00	1.40E-02	3.39E-02	See footenote	1.56E-01	3.65E-04	1.05E-02	9.06E+00	2.03E+01	4.53E+01	1.16E-03	5.18E-04	2.32E-04
Zinc	5.60E+01	2.48E+00	1.39E+02	3.58E-01	2.00E+01	See footenote	3.10E+01	2.00E-02	1.03E+00	2.08E+01	4.65E+01	1.04E+02	4.96E-02	2.22E-02	9.92E-03
Polychlorinated Biphenyls															
Aroclor-1260	1.74E-02	4.30E+00	7.46E-02	1.05E-01	1.83E-03	See footenote	3.46E-02	3.20E-04	1.03E-03	1.40E-01	3.11E-01	6.90E-01	7.33E-03	3.30E-03	1.49E-03
Pesticides															
Dieldrin	6.07E-02	1.47E+01	8.93E-01	4.00E-01	2.43E-02	See footenote	4.06E-01	5.17E-05	1.16E-02	2.80E-02	6.26E-02	1.40E-01	4.15E-01	1.86E-01	8.31E-02
Endosulfan I	2.01E-01	1.00E+00	2.01E-01	1.69E+00	3.39E-01	See footenote	2.70E-01	2.60E-05	8.23E-03	1.00E+00	2.24E+00	5.00E+00	8.23E-03	3.68E-03	1.65E-03
Endrin	2.18E-02	3.60E+00	7.85E-02	5.35E-01	1.17E-02	See footenote	4.15E-02	5.17E-05	1.21E-03	1.84E-01	4.11E-01	9.20E-01	6.60E-03	2.95E-03	1.32E-03
Semivolatile Organics															
Anthracene	1.30E+01	3.20E-01	4.15E+00	8.61E-01	1.12E+01	See footenote	0.00E+00	9.54E-05	3.82E-02	1.00E+03	2.24E+03	5.00E+03	3.82E-05	1.71E-05	7.64E-06
Benzo(a)anthracene	1.76E+01	2.70E-01	4.74E+00	2.94E-01	5.16E+00	See footenote	0.00E+00	9.73E-05	2.99E-02	2.00E+00	4.47E+00	1.00E+01	1.49E-02	6.68E-03	2.99E-03
Benzo(a)pyrene	1.28E+01	3.40E-01	4.34E+00	2.01E-01	2.56E+00	See footenote	0.00E+00	1.05E-04	1.99E-02	2.00E+00	4.47E+00	1.00E+01	9.97E-03	4.46E-03	1.99E-03
Benzo(b)fluoranthene	1.93E+01	2.10E-01	4.05E+00	3.10E-01	5.98E+00	See footenote	0.00E+00	1.11E-04	3.25E-02	2.00E+00	4.47E+00	1.00E+01	1.62E-02	7.27E-03	3.25E-03
Benzo(g,h,i)perylene	7.04E+00	1.50E-01	1.06E+00	1.16E-01	8.14E-01	See footenote	0.00E+00	1.00E-04	8.61E-03	2.00E+00	4.47E+00	1.00E+01	4.30E-03	1.92E-03	8.61E-04
Benzo(k)fluoranthene	8.13E+00	2.10E-01	1.71E+00	1.84E-01	1.50E+00	See footenote	0.00E+00	9.76E-05	1.15E-02	2.00E+00	4.47E+00	1.00E+01	5.77E-03	2.58E-03	1.15E-03
Chrysene	2.03E+01	4.40E-01	8.91E+00	2.94E-01	5.96E+00	See footenote	0.00E+00	9.42E-05	3.74E-02	2.00E+00	4.47E+00	1.00E+01	1.87E-02	8.37E-03	3.74E-03
Fluoranthene	4.76E+01	3.70E-01	1.76E+01	5.00E-01	2.38E+01	See footenote	0.00E+00	1.23E-04	1.06E-01	5.00E+02	1.12E+03	2.50E+03	2.12E-04	9.46E-05	4.23E-05
Indeno(1,2,3-cd)pyrene	6.79E+00	4.10E-01	2.78E+00	1.10E-01	7.47E-01	See footenote	0.00E+00	1.07E-04	9.72E-03	2.00E+00	4.47E+00	1.00E+01	4.86E-03	2.17E-03	9.72E-04
Phenanthrene	4.38E+01	2.80E-01	1.23E+01	8.61E-01	3.77E+01	See footenote	0.00E+00	8.92E-05	1.28E-01	5.00E+02	1.12E+03	2.50E+03	2.55E-04	1.14E-04	5.10E-05
Pyrene	3.72E+01	3.90E-01	1.45E+01	7.20E-01	2.68E+01	See footenote	0.00E+00	1.34E-04	1.01E-01	2.00E+00	4.47E+00	1.00E+01	5.03E-02	2.25E-02	1.01E-02

Assumes equal proportions of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1231 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.028 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 0.874 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.028 = Proportion of diet composed of soil
WIR = 0.3494 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 4.06 = Body weight (kg)

TABLE B-8-5
Summary of American Robin Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
AOC 3

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Arsenic	3.13E+00	2.58E-01	8.07E-01	3.71E-02	1.16E-01	6.88E-03	4.06E-02	2.46E+00	4.26E+00	7.38E+00	1.65E-02	9.53E-03	5.50E-03
Cadmium	2.73E-01	7.66E+00	2.09E+00	5.86E-01	1.60E-01	3.24E-04	7.19E-02	1.45E+00	5.39E+00	2.00E+01	4.96E-02	1.34E-02	3.60E-03
Chromium	1.90E+01	3.20E-01	6.09E+00	4.10E-02	7.79E-01	1.20E-03	2.81E-01	1.00E+00	2.24E+00	5.00E+00	2.81E-01	1.26E-01	5.61E-02
Lead	9.71E+01	3.07E-01	2.98E+01	3.90E-02	3.79E+00	1.30E-03	1.39E+00	3.85E+00	8.61E+00	1.93E+01	3.60E-01	1.61E-01	7.20E-02
Mercury	3.89E-02	1.19E+00	4.61E-02	6.52E-01	2.53E-02	1.00E-04	2.51E-03	4.90E-01	7.67E-01	1.20E+00	5.13E-03	3.28E-03	2.10E-03
Selenium	3.92E-01	9.82E-01	3.85E-01	5.67E-01	2.22E-01	1.96E-03	2.18E-02	4.40E-01	6.80E-01	1.05E+00	4.95E-02	3.20E-02	2.07E-02
Silver	2.42E+00	2.05E+00	4.96E+00	1.40E-02	3.39E-02	3.65E-04	1.63E-01	7.00E+00	1.57E+01	3.50E+01	2.33E-02	1.04E-02	4.67E-03
Zinc	5.60E+01	2.48E+00	1.39E+02	3.58E-01	2.00E+01	2.00E-02	5.25E+00	1.45E+01	4.36E+01	1.31E+02	3.62E-01	1.20E-01	4.00E-02
Polychlorinated Biphenyls													
Aroclor-1260	1.74E-02	4.30E+00	7.46E-02	1.05E-01	1.83E-03	3.20E-04	2.49E-03	4.10E-01	9.17E-01	2.05E+00	6.07E-03	2.71E-03	1.21E-03
Pesticides													
Dieldrin	6.07E-02	1.47E+01	8.93E-01	4.00E-01	2.43E-02	5.17E-05	2.89E-02	7.70E-02	1.72E-01	3.85E-01	3.75E-01	1.68E-01	7.49E-02
Endosulfan I	2.01E-01	1.00E+00	2.01E-01	1.69E+00	3.39E-01	2.60E-05	1.95E-02	1.00E+01	2.24E+01	5.00E+01	1.95E-03	8.71E-04	3.89E-04
Endrin	2.18E-02	3.60E+00	7.85E-02	5.35E-01	1.17E-02	5.17E-05	2.95E-03	2.00E-02	4.47E-02	1.00E-01	1.48E-01	6.60E-02	2.95E-02
Semivolatile Organics													
Anthracene	1.30E+01	3.20E-01	4.15E+00	8.61E-01	1.12E+01	9.54E-05	5.85E-01	7.10E+00	1.59E+01	3.55E+01	8.24E-02	3.69E-02	1.65E-02
Benzo(a)anthracene	1.76E+01	2.70E-01	4.74E+00	2.94E-01	5.16E+00	9.73E-05	3.97E-01	7.10E+00	1.59E+01	3.55E+01	5.59E-02	2.50E-02	1.12E-02
Benzo(a)pyrene	1.28E+01	3.40E-01	4.34E+00	2.01E-01	2.56E+00	1.05E-04	2.72E-01	7.10E+00	1.59E+01	3.55E+01	3.83E-02	1.71E-02	7.65E-03
Benzo(b)fluoranthene	1.93E+01	2.10E-01	4.05E+00	3.10E-01	5.98E+00	1.11E-04	4.11E-01	7.10E+00	1.59E+01	3.55E+01	5.79E-02	2.59E-02	1.16E-02
Benzo(g,h,i)perylene	7.04E+00	1.50E-01	1.06E+00	1.16E-01	8.14E-01	1.00E-04	8.61E-02	7.10E+00	1.59E+01	3.55E+01	1.21E-02	5.43E-03	2.43E-03
Benzo(k)fluoranthene	8.13E+00	2.10E-01	1.71E+00	1.84E-01	1.50E+00	9.76E-05	1.35E-01	7.10E+00	1.59E+01	3.55E+01	1.91E-02	8.53E-03	3.81E-03
Chrysene	2.03E+01	4.40E-01	8.91E+00	2.94E-01	5.96E+00	9.42E-05	5.65E-01	7.10E+00	1.59E+01	3.55E+01	7.95E-02	3.56E-02	1.59E-02
Fluoranthene	4.76E+01	3.70E-01	1.76E+01	5.00E-01	2.38E+01	1.23E-04	1.59E+00	7.10E+00	1.59E+01	3.55E+01	2.23E-01	9.99E-02	4.47E-02
Indeno(1,2,3-cd)pyrene	6.79E+00	4.10E-01	2.78E+00	1.10E-01	7.47E-01	1.07E-04	1.37E-01	7.10E+00	1.59E+01	3.55E+01	1.92E-02	8.60E-03	3.85E-03
Phenanthrene	4.38E+01	2.80E-01	1.23E+01	8.61E-01	3.77E+01	8.92E-05	1.92E+00	7.10E+00	1.59E+01	3.55E+01	2.71E-01	1.21E-01	5.41E-02
Pyrene	3.72E+01	3.90E-01	1.45E+01	7.20E-01	2.68E+01	1.34E-04	1.57E+00	7.10E+00	1.59E+01	3.55E+01	2.21E-01	9.86E-02	4.41E-02

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0055	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.435	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.519	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.046	= Proportion of diet composed of soil
WIR =	0.0106	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.0773	= Body weight (kg)

TABLE B-8-6
Summary of Red-tailed Hawk Exposure Doses - Baseline (Step 3A) - Arithmetic Mean
AOC 3

Chemical	Mean Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	Mean Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	3.13E+00	2.58E-01	8.07E-01	3.71E-02	1.16E-01	See footenote	1.31E-02	6.88E-03	8.09E-04	2.46E+00	4.26E+00	7.38E+00	3.29E-04	1.90E-04	1.10E-04
Cadmium	2.73E-01	7.66E+00	2.09E+00	5.86E-01	1.60E-01	See footenote	2.27E-01	3.24E-04	7.27E-03	1.45E+00	5.39E+00	2.00E+01	5.02E-03	1.35E-03	3.64E-04
Chromium	1.90E+01	3.20E-01	6.09E+00	4.10E-02	7.79E-01	See footenote	1.54E+00	1.20E-03	4.94E-02	1.00E+00	2.24E+00	5.00E+00	4.94E-02	2.21E-02	9.88E-03
Lead	9.71E+01	3.07E-01	2.98E+01	3.90E-02	3.79E+00	See footenote	7.87E+00	1.30E-03	2.52E-01	3.85E+00	8.61E+00	1.93E+01	6.55E-02	2.93E-02	1.31E-02
Mercury	3.89E-02	1.19E+00	4.61E-02	6.52E-01	2.53E-02	See footenote	2.44E-03	1.00E-04	8.39E-05	4.90E-01	7.67E-01	1.20E+00	1.71E-04	1.09E-04	6.99E-05
Selenium	3.92E-01	9.82E-01	3.85E-01	5.67E-01	2.22E-01	See footenote	1.05E-01	1.96E-03	3.47E-03	4.40E-01	6.80E-01	1.05E+00	7.89E-03	5.11E-03	3.31E-03
Silver	2.42E+00	2.05E+00	4.96E+00	1.40E-02	3.39E-02	See footenote	1.56E-01	3.65E-04	5.00E-03	7.00E+00	1.57E+01	3.50E+01	7.14E-04	3.19E-04	1.43E-04
Zinc	5.60E+01	2.48E+00	1.39E+02	3.58E-01	2.00E+01	See footenote	3.10E+01	2.00E-02	9.95E-01	1.45E+01	4.36E+01	1.31E+02	6.86E-02	2.28E-02	7.59E-03
Polychlorinated Biphenyls															
Aroclor-1260	1.74E-02	4.30E+00	7.46E-02	1.05E-01	1.83E-03	See footenote	3.46E-02	3.20E-04	1.12E-03	4.10E-01	9.17E-01	2.05E+00	2.74E-03	1.23E-03	5.49E-04
Pesticides															
Dieldrin	6.07E-02	1.47E+01	8.93E-01	4.00E-01	2.43E-02	See footenote	4.06E-01	5.17E-05	1.30E-02	7.70E-02	1.72E-01	3.85E-01	1.69E-01	7.56E-02	3.38E-02
Endosulfan I	2.01E-01	1.00E+00	2.01E-01	1.69E+00	3.39E-01	See footenote	2.70E-01	2.60E-05	8.66E-03	1.00E+01	2.24E+01	5.00E+01	8.66E-04	3.87E-04	1.73E-04
Endrin	2.18E-02	3.60E+00	7.85E-02	5.35E-01	1.17E-02	See footenote	4.15E-02	5.17E-05	1.33E-03	2.00E-02	4.47E-02	1.00E-01	6.66E-02	2.98E-02	1.33E-02
Semivolatile Organics															
Anthracene	1.30E+01	3.20E-01	4.15E+00	8.61E-01	1.12E+01	See footenote	0.00E+00	9.54E-05	5.41E-06	7.10E+00	1.59E+01	3.55E+01	7.62E-07	3.41E-07	1.52E-07
Benzo(a)anthracene	1.76E+01	2.70E-01	4.74E+00	2.94E-01	5.16E+00	See footenote	0.00E+00	9.73E-05	5.52E-06	7.10E+00	1.59E+01	3.55E+01	7.78E-07	3.48E-07	1.56E-07
Benzo(a)pyrene	1.28E+01	3.40E-01	4.34E+00	2.01E-01	2.56E+00	See footenote	0.00E+00	1.05E-04	5.95E-06	7.10E+00	1.59E+01	3.55E+01	8.38E-07	3.75E-07	1.68E-07
Benzo(b)fluoranthene	1.93E+01	2.10E-01	4.05E+00	3.10E-01	5.98E+00	See footenote	0.00E+00	1.11E-04	6.28E-06	7.10E+00	1.59E+01	3.55E+01	8.85E-07	3.96E-07	1.77E-07
Benzo(g,h,i)perylene	7.04E+00	1.50E-01	1.06E+00	1.16E-01	8.14E-01	See footenote	0.00E+00	1.00E-04	5.70E-06	7.10E+00	1.59E+01	3.55E+01	8.02E-07	3.59E-07	1.60E-07
Benzo(k)fluoranthene	8.13E+00	2.10E-01	1.71E+00	1.84E-01	1.50E+00	See footenote	0.00E+00	9.76E-05	5.54E-06	7.10E+00	1.59E+01	3.55E+01	7.80E-07	3.49E-07	1.56E-07
Chrysene	2.03E+01	4.40E-01	8.91E+00	2.94E-01	5.96E+00	See footenote	0.00E+00	9.42E-05	5.35E-06	7.10E+00	1.59E+01	3.55E+01	7.53E-07	3.37E-07	1.51E-07
Fluoranthene	4.76E+01	3.70E-01	1.76E+01	5.00E-01	2.38E+01	See footenote	0.00E+00	1.23E-04	6.98E-06	7.10E+00	1.59E+01	3.55E+01	9.83E-07	4.40E-07	1.97E-07
Indeno(1,2,3-cd)pyrene	6.79E+00	4.10E-01	2.78E+00	1.10E-01	7.47E-01	See footenote	0.00E+00	1.07E-04	6.04E-06	7.10E+00	1.59E+01	3.55E+01	8.51E-07	3.81E-07	1.70E-07
Phenanthrene	4.38E+01	2.80E-01	1.23E+01	8.61E-01	3.77E+01	See footenote	0.00E+00	8.92E-05	5.06E-06	7.10E+00	1.59E+01	3.55E+01	7.12E-07	3.19E-07	1.42E-07
Pyrene	3.72E+01	3.90E-01	1.45E+01	7.20E-01	2.68E+01	See footenote	0.00E+00	1.34E-04	7.59E-06	7.10E+00	1.59E+01	3.55E+01	1.07E-06	4.78E-07	2.14E-07

Assumes equal proportionss of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0360 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
WIR = 0.0639 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 1.126 = Body weight (kg)

TABLE B-9-1
Summary of Meadow Vole Exposure Doses - Baseline (Step 3A) - 95% UCL
AOC 3

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	4.01E+00	2.58E-01	1.03E+00	3.71E-02	1.49E-01	1.46E-02	1.57E-02	2.52E-01	5.63E-01	1.26E+00	6.23E-02	2.79E-02	1.25E-02	5.42E-03	2.17E-02
Cadmium	4.10E-01	7.66E+00	3.14E+00	5.86E-01	2.40E-01	4.29E-04	1.48E-02	1.00E+00	3.16E+00	1.00E+01	1.48E-02	4.69E-03	1.48E-03	1.34E-01	5.49E-02
Chromium	2.66E+01	3.20E-01	8.50E+00	4.10E-02	1.09E+00	1.55E-03	9.05E-02	3.28E+00	7.33E+00	1.64E+01	2.76E-02	1.23E-02	5.52E-03	8.84E-02	2.35E+00
Lead	2.24E+02	3.07E-01	6.88E+01	3.90E-02	8.74E+00	2.07E-03	7.38E-01	8.00E+00	2.53E+01	8.00E+01	9.23E-02	2.92E-02	9.23E-03	4.06E-02	9.10E+00
Mercury	5.60E-02	1.19E+00	6.64E-02	6.52E-01	3.65E-02	1.00E-04	1.85E-03	3.20E-02	7.16E-02	1.60E-01	5.79E-02	2.59E-02	1.16E-02	6.72E-02	3.76E-03
Selenium	4.94E-01	9.82E-01	4.85E-01	5.67E-01	2.80E-01	2.32E-03	1.46E-02	2.00E-01	2.57E-01	3.30E-01	7.31E-02	5.69E-02	4.43E-02	2.73E-01	1.35E-01
Silver	5.72E+00	2.05E+00	1.17E+01	1.40E-02	8.01E-02	4.69E-04	2.20E-02	9.06E+00	2.03E+01	4.53E+01	2.42E-03	1.08E-03	4.85E-04	5.68E-03	3.25E-02
Zinc	8.24E+01	2.48E+00	2.04E+02	3.58E-01	2.95E+01	2.76E-02	1.68E+00	1.60E+02	2.26E+02	3.20E+02	1.05E-02	7.41E-03	5.24E-03	2.93E-01	2.41E+01
Polychlorinated Biphenyls															
Aroclor-1260	3.07E-02	4.30E+00	1.32E-01	1.05E-01	3.23E-03	3.41E-04	3.87E-04	1.36E-01	3.04E-01	6.80E-01	2.85E-03	1.27E-03	5.70E-04	See footnote	6.47E-03
Pesticides															
Dieldrin	1.68E-01	1.47E+01	2.46E+00	4.00E-01	6.71E-02	5.52E-05	5.74E-03	4.00E-02	8.94E-02	2.00E-01	1.44E-01	6.42E-02	2.87E-02	See footnote	1.17E-01
Endosulfan I	5.63E-01	1.00E+00	5.63E-01	1.69E+00	9.50E-01	2.78E-05	4.56E-02	1.50E-01	3.35E-01	7.50E-01	3.04E-01	1.36E-01	6.07E-02	See footnote	9.33E-01
Endrin	4.32E-02	3.60E+00	1.56E-01	5.35E-01	2.31E-02	5.52E-05	1.29E-03	1.84E-01	4.11E-01	9.20E-01	7.02E-03	3.14E-03	1.40E-03	See footnote	2.62E-02
Semivolatile Organics															
Anthracene	3.60E+01	3.20E-01	1.15E+01	8.61E-01	3.10E+01	9.61E-05	1.50E+00	1.00E+03	2.24E+03	5.00E+03	1.50E-03	6.71E-04	3.00E-04	0.00E+00	0.00E+00
Benzo(a)anthracene	4.70E+01	2.70E-01	1.27E+01	2.94E-01	1.38E+01	1.09E-04	7.13E-01	2.00E+00	4.47E+00	1.00E+01	3.57E-01	1.59E-01	7.13E-02	0.00E+00	0.00E+00
Benzo(a)pyrene	3.40E+01	3.40E-01	1.16E+01	2.01E-01	6.82E+00	1.25E-04	3.70E-01	2.00E+00	4.47E+00	1.00E+01	1.85E-01	8.27E-02	3.70E-02	0.00E+00	0.00E+00
Benzo(b)fluoranthene	5.21E+01	2.10E-01	1.09E+01	3.10E-01	1.61E+01	1.37E-04	8.25E-01	2.00E+00	4.47E+00	1.00E+01	4.12E-01	1.84E-01	8.25E-02	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.91E+01	1.50E-01	2.86E+00	1.16E-01	2.20E+00	1.09E-04	1.28E-01	2.00E+00	4.47E+00	1.00E+01	6.40E-02	2.86E-02	1.28E-02	0.00E+00	0.00E+00
Benzo(k)fluoranthene	2.14E+01	2.10E-01	4.49E+00	1.84E-01	3.94E+00	1.06E-04	2.13E-01	2.00E+00	4.47E+00	1.00E+01	1.07E-01	4.77E-02	2.13E-02	0.00E+00	0.00E+00
Chrysene	5.47E+01	4.40E-01	2.41E+01	2.94E-01	1.61E+01	9.65E-05	8.38E-01	2.00E+00	4.47E+00	1.00E+01	4.19E-01	1.87E-01	8.38E-02	0.00E+00	0.00E+00
Fluoranthene	1.30E+02	3.70E-01	4.80E+01	5.00E-01	6.48E+01	1.55E-04	3.22E+00	5.00E+02	1.12E+03	2.50E+03	6.45E-03	2.88E-03	1.29E-03	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	1.81E+01	4.10E-01	7.41E+00	1.10E-01	1.99E+00	1.26E-04	1.21E-01	2.00E+00	4.47E+00	1.00E+01	6.06E-02	2.71E-02	1.21E-02	0.00E+00	0.00E+00
Phenanthrene	1.21E+02	2.80E-01	3.39E+01	8.61E-01	1.04E+02	9.46E-05	5.04E+00	5.00E+02	1.12E+03	2.50E+03	1.01E-02	4.51E-03	2.02E-03	0.00E+00	0.00E+00
Pyrene	1.01E+02	3.90E-01	3.94E+01	7.20E-01	7.28E+01	1.73E-04	3.56E+00	2.00E+00	4.47E+00	1.00E+01	**1.78E+00**	7.95E-01	3.56E-01	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0021 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.020 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.956 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.024 = Proportion of diet composed of soil
WIR = 0.0090 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0428 = Body weight (kg)

TABLE B-9-2
Summary of Short-tailed Shrew Exposure Doses - Baseline (Step 3A) - 95% UCL
AOC 3

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	4.01E+00	2.58E-01	1.03E+00	3.71E-02	1.49E-01	1.46E-02	1.25E-01	2.52E-01	5.63E-01	1.26E+00	4.97E-01	2.22E-01	9.94E-02	3.87E-03	1.55E-02
Cadmium	4.10E-01	7.66E+00	3.14E+00	5.86E-01	2.40E-01	4.29E-04	2.34E-01	1.00E+00	3.16E+00	1.00E+01	2.34E-01	7.41E-02	2.34E-02	2.21E+00	9.07E-01
Chromium	2.66E+01	3.20E-01	8.50E+00	4.10E-02	1.09E+00	1.55E-03	9.30E-01	3.28E+00	7.33E+00	1.64E+01	2.83E-01	1.27E-01	5.67E-02	8.50E-02	2.26E+00
Lead	2.24E+02	3.07E-01	6.88E+01	3.90E-02	8.74E+00	2.07E-03	7.63E+00	8.00E+00	2.53E+01	8.00E+01	9.53E-01	3.01E-01	9.53E-02	1.48E-01	3.31E+01
Mercury	5.60E-02	1.19E+00	6.64E-02	6.52E-01	3.65E-02	1.00E-04	5.65E-03	3.20E-02	7.16E-02	1.60E-01	1.77E-01	7.90E-02	3.53E-02	6.72E-02	3.76E-03
Selenium	4.94E-01	9.82E-01	4.85E-01	5.67E-01	2.80E-01	2.32E-03	4.27E-02	2.00E-01	2.57E-01	3.30E-01	2.14E-01	1.66E-01	1.29E-01	2.73E-01	1.35E-01
Silver	5.72E+00	2.05E+00	1.17E+01	1.40E-02	8.01E-02	4.69E-04	9.18E-01	9.06E+00	2.03E+01	4.53E+01	1.01E-01	4.53E-02	2.03E-02	3.56E-02	2.04E-01
Zinc	8.24E+01	2.48E+00	2.04E+02	3.58E-01	2.95E+01	2.76E-02	1.60E+01	1.60E+02	2.26E+02	3.20E+02	9.98E-02	7.06E-02	4.99E-02	8.62E-01	7.10E+01
Polychlorinated Biphenyls															
Aroclor-1260	3.07E-02	4.30E+00	1.32E-01	1.05E-01	3.23E-03	3.41E-04	1.01E-02	1.36E-01	3.04E-01	6.80E-01	7.40E-02	3.31E-02	1.48E-02	See footnote	1.13E-01
Pesticides															
Dieldrin	1.68E-01	1.47E+01	2.46E+00	4.00E-01	6.71E-02	5.52E-05	1.82E-01	4.00E-02	8.94E-02	2.00E-01	**4.54E+00**	**2.03E+00**	9.08E-01	See footnote	2.05E+00
Endosulfan I	5.63E-01	1.00E+00	5.63E-01	1.69E+00	9.50E-01	2.78E-05	5.15E-02	1.50E-01	3.35E-01	7.50E-01	3.43E-01	1.53E-01	6.86E-02	See footnote	5.81E-01
Endrin	4.32E-02	3.60E+00	1.56E-01	5.35E-01	2.31E-02	5.52E-05	1.19E-02	1.84E-01	4.11E-01	9.20E-01	6.49E-02	2.90E-02	1.30E-02	See footnote	1.35E-01
Semivolatile Organics															
Anthracene	3.60E+01	3.20E-01	1.15E+01	8.61E-01	3.10E+01	9.61E-05	1.38E+00	1.00E+03	2.24E+03	5.00E+03	1.38E-03	6.18E-04	2.76E-04	0.00E+00	0.00E+00
Benzo(a)anthracene	4.70E+01	2.70E-01	1.27E+01	2.94E-01	1.38E+01	1.09E-04	1.52E+00	2.00E+00	4.47E+00	1.00E+01	7.62E-01	3.41E-01	1.52E-01	0.00E+00	0.00E+00
Benzo(a)pyrene	3.40E+01	3.40E-01	1.16E+01	2.01E-01	6.82E+00	1.25E-04	1.26E+00	2.00E+00	4.47E+00	1.00E+01	6.31E-01	2.82E-01	1.26E-01	0.00E+00	0.00E+00
Benzo(b)fluoranthene	5.21E+01	2.10E-01	1.09E+01	3.10E-01	1.61E+01	1.37E-04	1.46E+00	2.00E+00	4.47E+00	1.00E+01	7.31E-01	3.27E-01	1.46E-01	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.91E+01	1.50E-01	2.86E+00	1.16E-01	2.20E+00	1.09E-04	4.37E-01	2.00E+00	4.47E+00	1.00E+01	2.18E-01	9.77E-02	4.37E-02	0.00E+00	0.00E+00
Benzo(k)fluoranthene	2.14E+01	2.10E-01	4.49E+00	1.84E-01	3.94E+00	1.06E-04	5.90E-01	2.00E+00	4.47E+00	1.00E+01	2.95E-01	1.32E-01	5.90E-02	0.00E+00	0.00E+00
Chrysene	5.47E+01	4.40E-01	2.41E+01	2.94E-01	1.61E+01	9.65E-05	2.45E+00	2.00E+00	4.47E+00	1.00E+01	**1.22E+00**	5.47E-01	2.45E-01	0.00E+00	0.00E+00
Fluoranthene	1.30E+02	3.70E-01	4.80E+01	5.00E-01	6.48E+01	1.55E-04	5.25E+00	5.00E+02	1.12E+03	2.50E+03	1.05E-02	4.70E-03	2.10E-03	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	1.81E+01	4.10E-01	7.41E+00	1.10E-01	1.99E+00	1.26E-04	7.56E-01	2.00E+00	4.47E+00	1.00E+01	3.78E-01	1.69E-01	7.56E-02	0.00E+00	0.00E+00
Phenanthrene	1.21E+02	2.80E-01	3.39E+01	8.61E-01	1.04E+02	9.46E-05	4.29E+00	5.00E+02	1.12E+03	2.50E+03	8.59E-03	3.84E-03	1.72E-03	0.00E+00	0.00E+00
Pyrene	1.01E+02	3.90E-01	3.94E+01	7.20E-01	7.28E+01	1.73E-04	4.34E+00	2.00E+00	4.47E+00	1.00E+01	**2.17E+00**	9.70E-01	4.34E-01	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI =	Chemical-specific	= Dietary intake for chemical (mg chemical/kg body weight/day)
FIR =	0.0015	= Food ingestion rate (kg/day dry weight)
FCxi =	Chemical-specific	= Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi =	0.823	= Proportion of diet composed of food item (soil invertebrates)
FCxi =	Chemical-specific	= Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi =	0.047	= Proportion of diet composed of food item (terrestrial plants)
SCx =	Chemical-specific	= Concentration of chemical in soil (mg/kg, dry weight)
PDS =	0.130	= Proportion of diet composed of soil
WIR =	0.0038	= Water ingestion rate (L/day)
WC =	Chemical-specific	= Concentration of chemical in water (mg/L)
BW =	0.01687	= Body weight (kg)

TABLE B-9-3
Summary of White-footed Mouse Exposure Doses - Baseline (Step 3A) - 95% UCL
AOC 3

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)
Metals															
Arsenic	4.01E+00	2.58E-01	1.03E+00	3.71E-02	1.49E-01	1.46E-02	1.98E-02	2.52E-01	5.63E-01	1.26E+00	7.85E-02	3.51E-02	1.57E-02	3.26E-03	1.31E-02
Cadmium	4.10E-01	7.66E+00	3.14E+00	5.86E-01	2.40E-01	4.29E-04	3.87E-02	1.00E+00	3.16E+00	1.00E+01	3.87E-02	1.22E-02	3.87E-03	1.44E-01	5.90E-02
Chromium	2.66E+01	3.20E-01	8.50E+00	4.10E-02	1.09E+00	1.55E-03	1.22E-01	3.28E+00	7.33E+00	1.64E+01	3.73E-02	1.67E-02	7.46E-03	7.00E-02	1.86E+00
Lead	2.24E+02	3.07E-01	6.88E+01	3.90E-02	8.74E+00	2.07E-03	9.91E-01	8.00E+00	2.53E+01	8.00E+01	1.24E-01	3.92E-02	1.24E-02	5.48E-02	1.23E+01
Mercury	5.60E-02	1.19E+00	6.64E-02	6.52E-01	3.65E-02	1.00E-04	1.25E-03	3.20E-02	7.16E-02	1.60E-01	3.91E-02	1.75E-02	7.83E-03	5.43E-02	3.04E-03
Selenium	4.94E-01	9.82E-01	4.85E-01	5.67E-01	2.80E-01	2.32E-03	9.83E-03	2.00E-01	2.57E-01	3.30E-01	4.92E-02	3.83E-02	2.98E-02	2.58E-01	1.27E-01
Silver	5.72E+00	2.05E+00	1.17E+01	1.40E-02	8.01E-02	4.69E-04	1.36E-01	9.06E+00	2.03E+01	4.53E+01	1.50E-02	6.70E-03	3.00E-03	1.51E-01	8.66E-01
Zinc	8.24E+01	2.48E+00	2.04E+02	3.58E-01	2.95E+01	2.76E-02	2.71E+00	1.60E+02	2.26E+02	3.20E+02	1.70E-02	1.20E-02	8.48E-03	5.09E-01	4.19E+01
Polychlorinated Biphenyls															
Aroclor-1260	3.07E-02	4.30E+00	1.32E-01	1.05E-01	3.23E-03	3.41E-04	1.65E-03	1.36E-01	3.04E-01	6.80E-01	1.21E-02	5.41E-03	2.42E-03	See footnote	6.43E-02
Pesticides															
Dieldrin	1.68E-01	1.47E+01	2.46E+00	4.00E-01	6.71E-02	5.52E-05	2.87E-02	4.00E-02	8.94E-02	2.00E-01	7.17E-01	3.21E-01	1.43E-01	See footnote	1.19E+00
Endosulfan I	5.63E-01	1.00E+00	5.63E-01	1.69E+00	9.50E-01	2.78E-05	1.83E-02	1.50E-01	3.35E-01	7.50E-01	1.22E-01	5.44E-02	2.43E-02	See footnote	7.61E-01
Endrin	4.32E-02	3.60E+00	1.56E-01	5.35E-01	2.31E-02	5.52E-05	2.07E-03	1.84E-01	4.11E-01	9.20E-01	1.13E-02	5.04E-03	2.25E-03	See footnote	8.58E-02
Semivolatile Organics															
Anthracene	3.60E+01	3.20E-01	1.15E+01	8.61E-01	3.10E+01	9.61E-05	5.26E-01	1.00E+03	2.24E+03	5.00E+03	5.26E-04	2.35E-04	1.05E-04	0.00E+00	0.00E+00
Benzo(a)anthracene	4.70E+01	2.70E-01	1.27E+01	2.94E-01	1.38E+01	1.09E-04	3.35E-01	2.00E+00	4.47E+00	1.00E+01	1.68E-01	7.49E-02	3.35E-02	0.00E+00	0.00E+00
Benzo(a)pyrene	3.40E+01	3.40E-01	1.16E+01	2.01E-01	6.82E+00	1.25E-04	2.30E-01	2.00E+00	4.47E+00	1.00E+01	1.15E-01	5.15E-02	2.30E-02	0.00E+00	0.00E+00
Benzo(b)fluoranthene	5.21E+01	2.10E-01	1.09E+01	3.10E-01	1.61E+01	1.37E-04	3.46E-01	2.00E+00	4.47E+00	1.00E+01	1.73E-01	7.73E-02	3.46E-02	0.00E+00	0.00E+00
Benzo(g,h,i)perylene	1.91E+01	1.50E-01	2.86E+00	1.16E-01	2.20E+00	1.09E-04	6.84E-02	2.00E+00	4.47E+00	1.00E+01	3.42E-02	1.53E-02	6.84E-03	0.00E+00	0.00E+00
Benzo(k)fluoranthene	2.14E+01	2.10E-01	4.49E+00	1.84E-01	3.94E+00	1.06E-04	1.09E-01	2.00E+00	4.47E+00	1.00E+01	5.46E-02	2.44E-02	1.09E-02	0.00E+00	0.00E+00
Chrysene	5.47E+01	4.40E-01	2.41E+01	2.94E-01	1.61E+01	9.65E-05	4.94E-01	2.00E+00	4.47E+00	1.00E+01	2.47E-01	1.11E-01	4.94E-02	0.00E+00	0.00E+00
Fluoranthene	1.30E+02	3.70E-01	4.80E+01	5.00E-01	6.48E+01	1.55E-04	1.40E+00	5.00E+02	1.12E+03	2.50E+03	2.79E-03	1.25E-03	5.58E-04	0.00E+00	0.00E+00
Indeno(1,2,3-cd)pyrene	1.81E+01	4.10E-01	7.41E+00	1.10E-01	1.99E+00	1.26E-04	1.17E-01	2.00E+00	4.47E+00	1.00E+01	5.83E-02	2.61E-02	1.17E-02	0.00E+00	0.00E+00
Phenanthrene	1.21E+02	2.80E-01	3.39E+01	8.61E-01	1.04E+02	9.46E-05	1.72E+00	5.00E+02	1.12E+03	2.50E+03	3.43E-03	1.53E-03	6.86E-04	0.00E+00	0.00E+00
Pyrene	1.01E+02	3.90E-01	3.94E+01	7.20E-01	7.28E+01	1.73E-04	1.38E+00	2.00E+00	4.47E+00	1.00E+01	6.92E-01	3.10E-01	1.38E-01	0.00E+00	0.00E+00

It was assumed that the concentration of each chemical in the small mammal's tissues was equal to the chemical concentration in its diet (a diet to whole-body BAF of 1.0 was assumed)

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0005 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.470 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.510 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.020 = Proportion of diet composed of soil
WIR = 0.0062 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0208 = Body weight (kg)

TABLE B-9-4
Summary of Red Fox Exposure Doses - Baseline (Step 3A) - 95% UCL
AOC 3

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.01E+00	2.58E-01	1.03E+00	3.71E-02	1.49E-01	See footenote	1.68E-02	1.46E-02	6.29E-03	1.20E+00	2.68E+00	6.00E+00	5.24E-03	2.35E-03	1.05E-03
Cadmium	4.10E-01	7.66E+00	3.14E+00	5.86E-01	2.40E-01	See footenote	3.40E-01	4.29E-04	1.26E-02	7.50E-01	1.68E+00	3.75E+00	1.68E-02	7.50E-03	3.35E-03
Chromium	2.66E+01	3.20E-01	8.50E+00	4.10E-02	1.09E+00	See footenote	2.15E+00	1.55E-03	8.93E-02	3.28E+00	7.33E+00	1.64E+01	2.72E-02	1.22E-02	5.44E-03
Lead	2.24E+02	3.07E-01	6.88E+01	3.90E-02	8.74E+00	See footenote	1.82E+01	2.07E-03	7.49E-01	8.00E+00	2.53E+01	8.00E+01	9.36E-02	2.96E-02	9.36E-03
Mercury	5.60E-02	1.19E+00	6.64E-02	6.52E-01	3.65E-02	See footenote	3.52E-03	1.00E-04	2.83E-04	1.50E-01	1.94E-01	2.50E-01	1.89E-03	1.46E-03	1.13E-03
Selenium	4.94E-01	9.82E-01	4.85E-01	5.67E-01	2.80E-01	See footenote	1.32E-01	2.32E-03	5.13E-03	2.00E-01	2.57E-01	3.30E-01	2.57E-02	2.00E-02	1.56E-02
Silver	5.72E+00	2.05E+00	1.17E+01	1.40E-02	8.01E-02	See footenote	3.67E-01	4.69E-04	2.47E-02	9.06E+00	2.03E+01	4.53E+01	2.73E-03	1.22E-03	5.46E-04
Zinc	8.24E+01	2.48E+00	2.04E+02	3.58E-01	2.95E+01	See footenote	4.57E+01	2.76E-02	1.52E+00	2.08E+01	4.65E+01	1.04E+02	7.30E-02	3.27E-02	1.46E-02
Polychlorinated Biphenyls															
Aroclor-1260	3.07E-02	4.30E+00	1.32E-01	1.05E-01	3.23E-03	See footenote	6.12E-02	3.41E-04	1.80E-03	1.40E-01	3.11E-01	6.90E-01	1.28E-02	5.78E-03	2.60E-03
Pesticides															
Dieldrin	1.68E-01	1.47E+01	2.46E+00	4.00E-01	6.71E-02	See footenote	1.12E+00	5.52E-05	3.21E-02	2.80E-02	6.26E-02	1.40E-01	**1.15E+00**	5.13E-01	2.29E-01
Endosulfan I	5.63E-01	1.00E+00	5.63E-01	1.69E+00	9.50E-01	See footenote	7.58E-01	2.78E-05	2.31E-02	1.00E+00	2.24E+00	5.00E+00	2.31E-02	1.03E-02	4.61E-03
Endrin	4.32E-02	3.60E+00	1.56E-01	5.35E-01	2.31E-02	See footenote	8.22E-02	5.52E-05	2.40E-03	1.84E-01	4.11E-01	9.20E-01	1.31E-02	5.84E-03	2.61E-03
Semivolatile Organics															
Anthracene	3.60E+01	3.20E-01	1.15E+01	8.61E-01	3.10E+01	See footenote	0.00E+00	9.61E-05	1.06E-01	1.00E+03	2.24E+03	5.00E+03	1.06E-04	4.74E-05	2.12E-05
Benzo(a)anthracene	4.70E+01	2.70E-01	1.27E+01	2.94E-01	1.38E+01	See footenote	0.00E+00	1.09E-04	8.01E-02	2.00E+00	4.47E+00	1.00E+01	4.00E-02	1.79E-02	8.01E-03
Benzo(a)pyrene	3.40E+01	3.40E-01	1.16E+01	2.01E-01	6.82E+00	See footenote	0.00E+00	1.25E-04	5.32E-02	2.00E+00	4.47E+00	1.00E+01	2.66E-02	1.19E-02	5.32E-03
Benzo(b)fluoranthene	5.21E+01	2.10E-01	1.09E+01	3.10E-01	1.61E+01	See footenote	0.00E+00	1.37E-04	8.77E-02	2.00E+00	4.47E+00	1.00E+01	4.39E-02	1.96E-02	8.77E-03
Benzo(g,h,i)perylene	1.91E+01	1.50E-01	2.86E+00	1.16E-01	2.20E+00	See footenote	0.00E+00	1.09E-04	2.33E-02	2.00E+00	4.47E+00	1.00E+01	1.16E-02	5.21E-03	2.33E-03
Benzo(k)fluoranthene	2.14E+01	2.10E-01	4.49E+00	1.84E-01	3.94E+00	See footenote	0.00E+00	1.06E-04	3.03E-02	2.00E+00	4.47E+00	1.00E+01	1.52E-02	6.78E-03	3.03E-03
Chrysene	5.47E+01	4.40E-01	2.41E+01	2.94E-01	1.61E+01	See footenote	0.00E+00	9.65E-05	1.01E-01	2.00E+00	4.47E+00	1.00E+01	5.05E-02	2.26E-02	1.01E-02
Fluoranthene	1.30E+02	3.70E-01	4.80E+01	5.00E-01	6.48E+01	See footenote	0.00E+00	1.55E-04	2.88E-01	5.00E+02	1.12E+03	2.50E+03	5.76E-04	2.58E-04	1.15E-04
Indeno(1,2,3-cd)pyrene	1.81E+01	4.10E-01	7.41E+00	1.10E-01	1.99E+00	See footenote	0.00E+00	1.26E-04	2.59E-02	2.00E+00	4.47E+00	1.00E+01	1.29E-02	5.78E-03	2.59E-03
Phenanthrene	1.21E+02	2.80E-01	3.39E+01	8.61E-01	1.04E+02	See footenote	0.00E+00	9.46E-05	3.53E-01	5.00E+02	1.12E+03	2.50E+03	7.05E-04	3.15E-04	1.41E-04
Pyrene	1.01E+02	3.90E-01	3.94E+01	7.20E-01	7.28E+01	See footenote	0.00E+00	1.73E-04	2.74E-01	2.00E+00	4.47E+00	1.00E+01	1.37E-01	6.12E-02	2.74E-02

Assumes equal proportions of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.1231 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.028 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.070 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 0.874 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.028 = Proportion of diet composed of soil
WIR = 0.3494 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 4.06 = Body weight (kg)

TABLE B-9-5
Summary of American Robin Exposure Doses - Baseline (Step 3A) - 95% UCL
AOC 3

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals													
Arsenic	4.01E+00	2.58E-01	1.03E+00	3.71E-02	1.49E-01	1.46E-02	5.28E-02	2.46E+00	4.26E+00	7.38E+00	2.15E-02	1.24E-02	7.16E-03
Cadmium	4.10E-01	7.66E+00	3.14E+00	5.86E-01	2.40E-01	4.29E-04	1.08E-01	1.45E+00	5.39E+00	2.00E+01	7.44E-02	2.00E-02	5.39E-03
Chromium	2.66E+01	3.20E-01	8.50E+00	4.10E-02	1.09E+00	1.55E-03	3.92E-01	1.00E+00	2.24E+00	5.00E+00	3.92E-01	1.75E-01	7.84E-02
Lead	2.24E+02	3.07E-01	6.88E+01	3.90E-02	8.74E+00	2.07E-03	3.20E+00	3.85E+00	8.61E+00	1.93E+01	8.31E-01	3.72E-01	1.66E-01
Mercury	5.60E-02	1.19E+00	6.64E-02	6.52E-01	3.65E-02	1.00E-04	3.61E-03	4.90E-01	7.67E-01	1.20E+00	7.38E-03	4.71E-03	3.01E-03
Selenium	4.94E-01	9.82E-01	4.85E-01	5.67E-01	2.80E-01	2.32E-03	2.74E-02	4.40E-01	6.80E-01	1.05E+00	6.23E-02	4.03E-02	2.61E-02
Silver	5.72E+00	2.05E+00	1.17E+01	1.40E-02	8.01E-02	4.69E-04	3.86E-01	7.00E+00	1.57E+01	3.50E+01	5.51E-02	2.46E-02	1.10E-02
Zinc	8.24E+01	2.48E+00	2.04E+02	3.58E-01	2.95E+01	2.76E-02	7.72E+00	1.45E+01	4.36E+01	1.31E+02	5.32E-01	1.77E-01	5.89E-02
Polychlorinated Biphenyls													
Aroclor-1260	3.07E-02	4.30E+00	1.32E-01	1.05E-01	3.23E-03	3.41E-04	4.37E-03	4.10E-01	9.17E-01	2.05E+00	1.07E-02	4.77E-03	2.13E-03
Pesticides													
Dieldrin	1.68E-01	1.47E+01	2.46E+00	4.00E-01	6.71E-02	5.52E-05	7.96E-02	7.70E-02	1.72E-01	3.85E-01	**1.03E+00**	4.62E-01	2.07E-01
Endosulfan I	5.63E-01	1.00E+00	5.63E-01	1.69E+00	9.50E-01	2.78E-05	5.46E-02	1.00E+01	2.24E+01	5.00E+01	5.46E-03	2.44E-03	1.09E-03
Endrin	4.32E-02	3.60E+00	1.56E-01	5.35E-01	2.31E-02	5.52E-05	5.84E-03	2.00E-02	4.47E-02	1.00E-01	2.92E-01	1.31E-01	5.84E-02
Semivolatile Organics													
Anthracene	3.60E+01	3.20E-01	1.15E+01	8.61E-01	3.10E+01	9.61E-05	1.63E+00	7.10E+00	1.59E+01	3.55E+01	2.29E-01	1.02E-01	4.58E-02
Benzo(a)anthracene	4.70E+01	2.70E-01	1.27E+01	2.94E-01	1.38E+01	1.09E-04	1.06E+00	7.10E+00	1.59E+01	3.55E+01	1.50E-01	6.69E-02	2.99E-02
Benzo(a)pyrene	3.40E+01	3.40E-01	1.16E+01	2.01E-01	6.82E+00	1.25E-04	7.25E-01	7.10E+00	1.59E+01	3.55E+01	1.02E-01	4.56E-02	2.04E-02
Benzo(b)fluoranthene	5.21E+01	2.10E-01	1.09E+01	3.10E-01	1.61E+01	1.37E-04	1.11E+00	7.10E+00	1.59E+01	3.55E+01	1.56E-01	6.99E-02	3.13E-02
Benzo(g,h,i)perylene	1.91E+01	1.50E-01	2.86E+00	1.16E-01	2.20E+00	1.09E-04	2.33E-01	7.10E+00	1.59E+01	3.55E+01	3.29E-02	1.47E-02	6.57E-03
Benzo(k)fluoranthene	2.14E+01	2.10E-01	4.49E+00	1.84E-01	3.94E+00	1.06E-04	3.56E-01	7.10E+00	1.59E+01	3.55E+01	5.02E-02	2.24E-02	1.00E-02
Chrysene	5.47E+01	4.40E-01	2.41E+01	2.94E-01	1.61E+01	9.65E-05	1.52E+00	7.10E+00	1.59E+01	3.55E+01	2.15E-01	9.60E-02	4.29E-02
Fluoranthene	1.30E+02	3.70E-01	4.80E+01	5.00E-01	6.48E+01	1.55E-04	4.32E+00	7.10E+00	1.59E+01	3.55E+01	6.08E-01	2.72E-01	1.22E-01
Indeno(1,2,3-cd)pyrene	1.81E+01	4.10E-01	7.41E+00	1.10E-01	1.99E+00	1.26E-04	3.64E-01	7.10E+00	1.59E+01	3.55E+01	5.12E-02	2.29E-02	1.02E-02
Phenanthrene	1.21E+02	2.80E-01	3.39E+01	8.61E-01	1.04E+02	9.46E-05	5.32E+00	7.10E+00	1.59E+01	3.55E+01	7.49E-01	3.35E-01	1.50E-01
Pyrene	1.01E+02	3.90E-01	3.94E+01	7.20E-01	7.28E+01	1.73E-04	4.26E+00	7.10E+00	1.59E+01	3.55E+01	6.00E-01	2.68E-01	1.20E-01

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0055 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.435 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.519 = Proportion of diet composed of food item (terrestrial plants)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.046 = Proportion of diet composed of soil
WIR = 0.0106 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 0.0773 = Body weight (kg)

TABLE B-9-6
Summary of Red-tailed Hawk Exposure Doses - Baseline (Step 3A) - 95% UCL
AOC 3

Chemical	95% UCL Surface Soil Concentration (mg/kg)	Soil-Worm BAF	Terrestrial Invertebrate Concentration (mg/kg dw)	Soil-Plant BAF	Terrestrial Plant Concentration (mg/kg dw)	Soil-Mammal BAF	Small Mammal Concentration (mg/kg dw)	95% UCL Surface Water Concentration (mg/L)	Dietary Intake (mg/kg/day)	NOAEL TRV (mg/kg/d)	MATC TRV (mg/kg/d)	LOAEL TRV (mg/kg/d)	NOAEL HQ	MATC HQ	LOAEL HQ
Metals															
Arsenic	4.01E+00	2.58E-01	1.03E+00	3.71E-02	1.49E-01	See footenote	1.68E-02	1.46E-02	1.36E-03	2.46E+00	4.26E+00	7.38E+00	5.54E-04	3.20E-04	1.85E-04
Cadmium	4.10E-01	7.66E+00	3.14E+00	5.86E-01	2.40E-01	See footenote	3.40E-01	4.29E-04	1.09E-02	1.45E+00	5.39E+00	2.00E+01	7.52E-03	2.03E-03	5.46E-04
Chromium	2.66E+01	3.20E-01	8.50E+00	4.10E-02	1.09E+00	See footenote	2.15E+00	1.55E-03	6.90E-02	1.00E+00	2.24E+00	5.00E+00	6.90E-02	3.09E-02	1.38E-02
Lead	2.24E+02	3.07E-01	6.88E+01	3.90E-02	8.74E+00	See footenote	1.82E+01	2.07E-03	5.82E-01	3.85E+00	8.61E+00	1.93E+01	1.51E-01	6.76E-02	3.02E-02
Mercury	5.60E-02	1.19E+00	6.64E-02	6.52E-01	3.65E-02	See footenote	3.52E-03	1.00E-04	1.18E-04	4.90E-01	7.67E-01	1.20E+00	2.41E-04	1.54E-04	9.86E-05
Selenium	4.94E-01	9.82E-01	4.85E-01	5.67E-01	2.80E-01	See footenote	1.32E-01	2.32E-03	4.37E-03	4.40E-01	6.80E-01	1.05E+00	9.93E-03	6.43E-03	4.16E-03
Silver	5.72E+00	2.05E+00	1.17E+01	1.40E-02	8.01E-02	See footenote	3.67E-01	4.69E-04	1.18E-02	7.00E+00	1.57E+01	3.50E+01	1.68E-03	7.53E-04	3.37E-04
Zinc	8.24E+01	2.48E+00	2.04E+02	3.58E-01	2.95E+01	See footenote	4.57E+01	2.76E-02	1.46E+00	1.45E+01	4.36E+01	1.31E+02	1.01E-01	3.36E-02	1.12E-02
Polychlorinated Biphenyls															
Aroclor-1260	3.07E-02	4.30E+00	1.32E-01	1.05E-01	3.23E-03	See footenote	6.12E-02	3.41E-04	1.98E-03	4.10E-01	9.17E-01	2.05E+00	4.82E-03	2.16E-03	9.65E-04
Pesticides															
Dieldrin	1.68E-01	1.47E+01	2.46E+00	4.00E-01	6.71E-02	See footenote	1.12E+00	5.52E-05	3.59E-02	7.70E-02	1.72E-01	3.85E-01	4.66E-01	2.08E-01	9.32E-02
Endosulfan I	5.63E-01	1.00E+00	5.63E-01	1.69E+00	9.50E-01	See footenote	7.58E-01	2.78E-05	2.43E-02	1.00E+01	2.24E+01	5.00E+01	2.43E-03	1.09E-03	4.85E-04
Endrin	4.32E-02	3.60E+00	1.56E-01	5.35E-01	2.31E-02	See footenote	8.22E-02	5.52E-05	2.63E-03	2.00E-02	4.47E-02	1.00E-01	1.32E-01	5.89E-02	2.63E-02
Semivolatile Organics															
Anthracene	3.60E+01	3.20E-01	1.15E+01	8.61E-01	3.10E+01	See footenote	0.00E+00	9.61E-05	5.45E-06	7.10E+00	1.59E+01	3.55E+01	7.68E-07	3.43E-07	1.54E-07
Benzo(a)anthracene	4.70E+01	2.70E-01	1.27E+01	2.94E-01	1.38E+01	See footenote	0.00E+00	1.09E-04	6.17E-06	7.10E+00	1.59E+01	3.55E+01	8.70E-07	3.89E-07	1.74E-07
Benzo(a)pyrene	3.40E+01	3.40E-01	1.16E+01	2.01E-01	6.82E+00	See footenote	0.00E+00	1.25E-04	7.10E-06	7.10E+00	1.59E+01	3.55E+01	1.00E-06	4.47E-07	2.00E-07
Benzo(b)fluoranthene	5.21E+01	2.10E-01	1.09E+01	3.10E-01	1.61E+01	See footenote	0.00E+00	1.37E-04	7.80E-06	7.10E+00	1.59E+01	3.55E+01	1.10E-06	4.91E-07	2.20E-07
Benzo(g,h,i)perylene	1.91E+01	1.50E-01	2.86E+00	1.16E-01	2.20E+00	See footenote	0.00E+00	1.09E-04	6.20E-06	7.10E+00	1.59E+01	3.55E+01	8.73E-07	3.90E-07	1.75E-07
Benzo(k)fluoranthene	2.14E+01	2.10E-01	4.49E+00	1.84E-01	3.94E+00	See footenote	0.00E+00	1.06E-04	6.03E-06	7.10E+00	1.59E+01	3.55E+01	8.49E-07	3.80E-07	1.70E-07
Chrysene	5.47E+01	4.40E-01	2.41E+01	2.94E-01	1.61E+01	See footenote	0.00E+00	9.65E-05	5.47E-06	7.10E+00	1.59E+01	3.55E+01	7.71E-07	3.45E-07	1.54E-07
Fluoranthene	1.30E+02	3.70E-01	4.80E+01	5.00E-01	6.48E+01	See footenote	0.00E+00	1.55E-04	8.78E-06	7.10E+00	1.59E+01	3.55E+01	1.24E-06	5.53E-07	2.47E-07
Indeno(1,2,3-cd)pyrene	1.81E+01	4.10E-01	7.41E+00	1.10E-01	1.99E+00	See footenote	0.00E+00	1.26E-04	7.17E-06	7.10E+00	1.59E+01	3.55E+01	1.01E-06	4.52E-07	2.02E-07
Phenanthrene	1.21E+02	2.80E-01	3.39E+01	8.61E-01	1.04E+02	See footenote	0.00E+00	9.46E-05	5.37E-06	7.10E+00	1.59E+01	3.55E+01	7.56E-07	3.38E-07	1.51E-07
Pyrene	1.01E+02	3.90E-01	3.94E+01	7.20E-01	7.28E+01	See footenote	0.00E+00	1.73E-04	9.82E-06	7.10E+00	1.59E+01	3.55E+01	1.38E-06	6.19E-07	2.77E-07

Assumes equal proportionss of voles, shrews, and mice

$$DI_x = \frac{[[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)] + [(WIR)(WC_x)]]}{BW}$$

DI = Chemical-specific = Dietary intake for chemical (mg chemical/kg body weight/day)
FIR = 0.0360 = Food ingestion rate (kg/day dry weight)
FCxi = Chemical-specific = Concentration of chemical in food item (soil invertebrates, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (soil invertebrates)
FCxi = Chemical-specific = Concentration of chemical in food item (terrestrial plants, dry weight basis)
PDFi = 0.000 = Proportion of diet composed of food item (terrestrial plants)
FCxi = Chemical-specific = Concentration of chemical in food item (small mammals, dry weight basis)
PDFi = 1.000 = Proportion of diet composed of food item (small mammals)
SCx = Chemical-specific = Concentration of chemical in soil (mg/kg, dry weight)
PDS = 0.000 = Proportion of diet composed of soil
WIR = 0.0639 = Water ingestion rate (L/day)
WC = Chemical-specific = Concentration of chemical in water (mg/L)
BW = 1.126 = Body weight (kg)

Appendix C
Test Pit Logs

PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP01 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

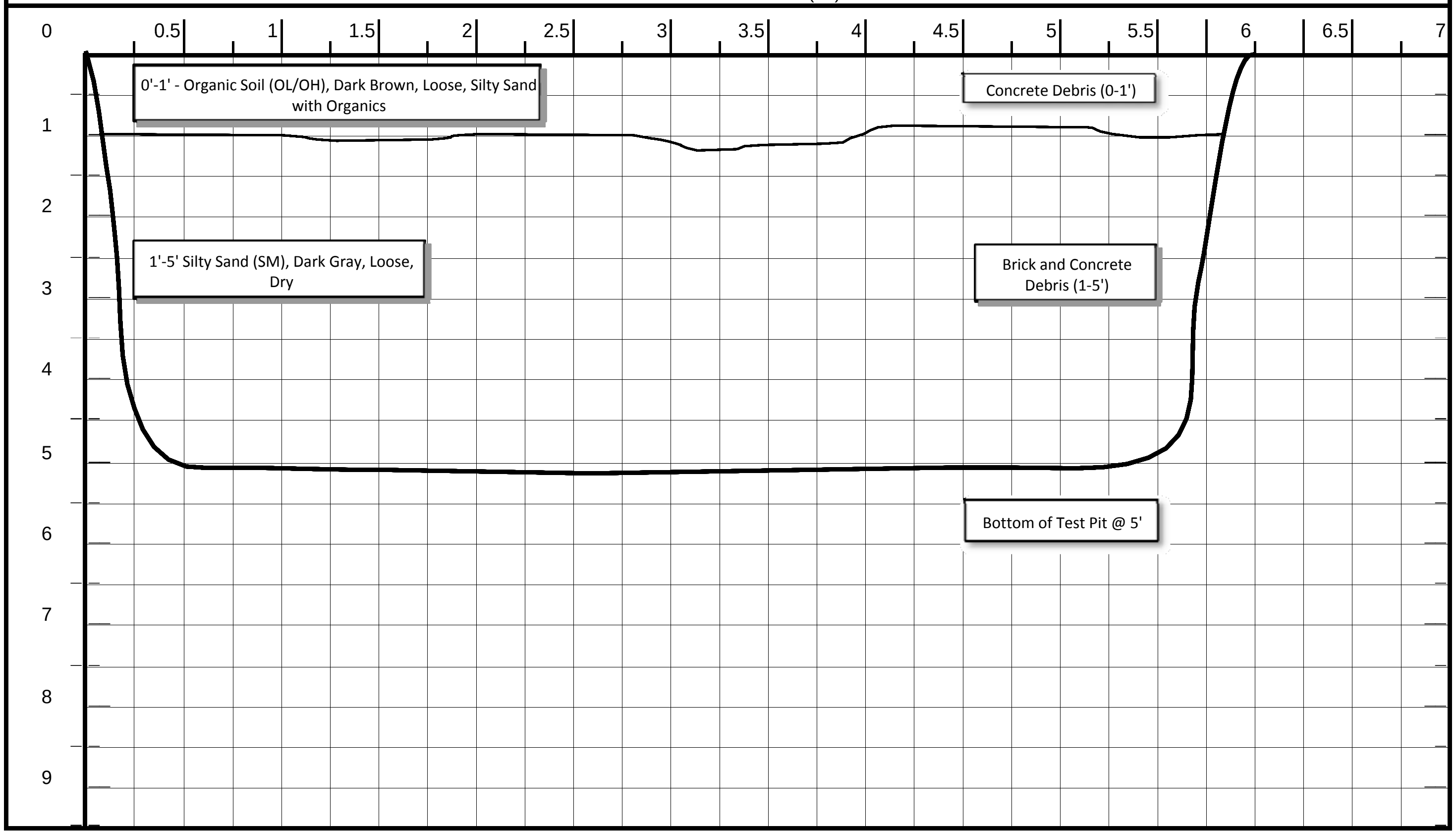
ELEVATION : 20.55 ft bgs | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/27/09

WATER LEVEL : N/A | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP02 SHEET 1 OF 1

CH2MHILL

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

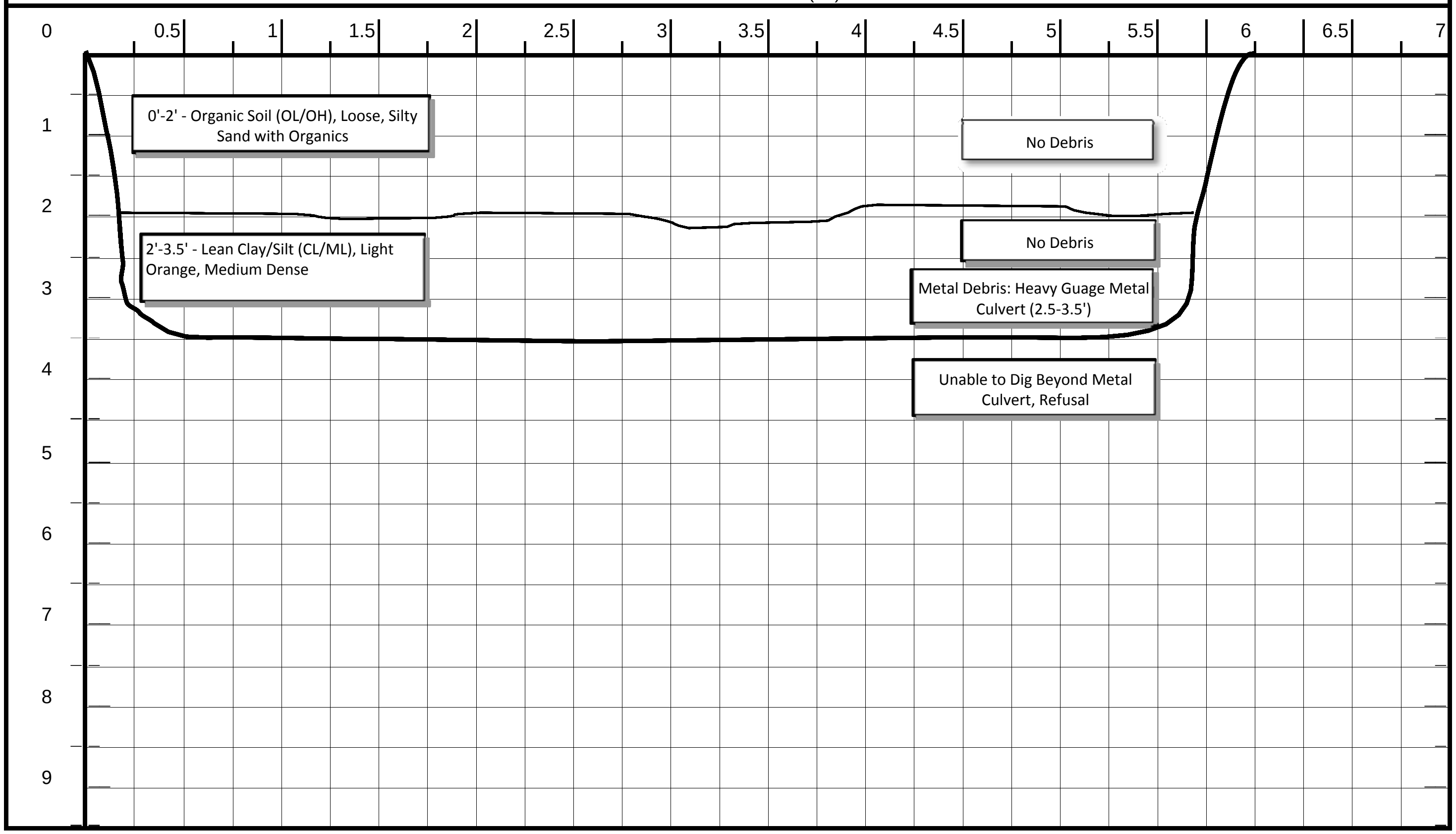
ELEVATION : 15.13 ft above msl | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/27/09

WATER LEVEL : N/A | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 3.5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



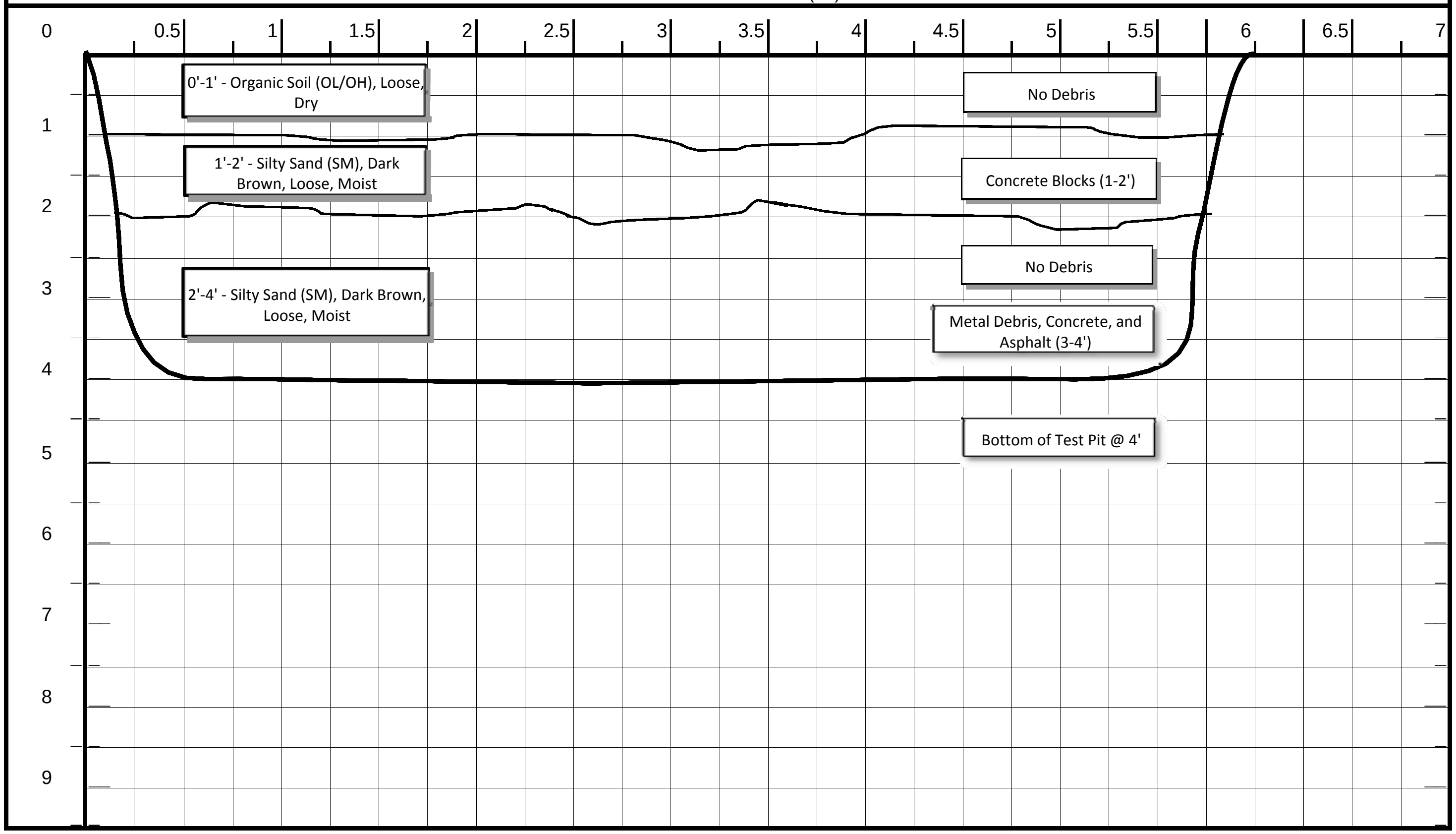
PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP03 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI   LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia   LOGGER : Mark Ost
ELEVATION : 18.39 ft above msl   CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe   DATE EXCAVATED: 10/27/09
WATER LEVEL : N/A   APPROX. DIMENS: Length: 6 ft   Width: 3 ft   Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



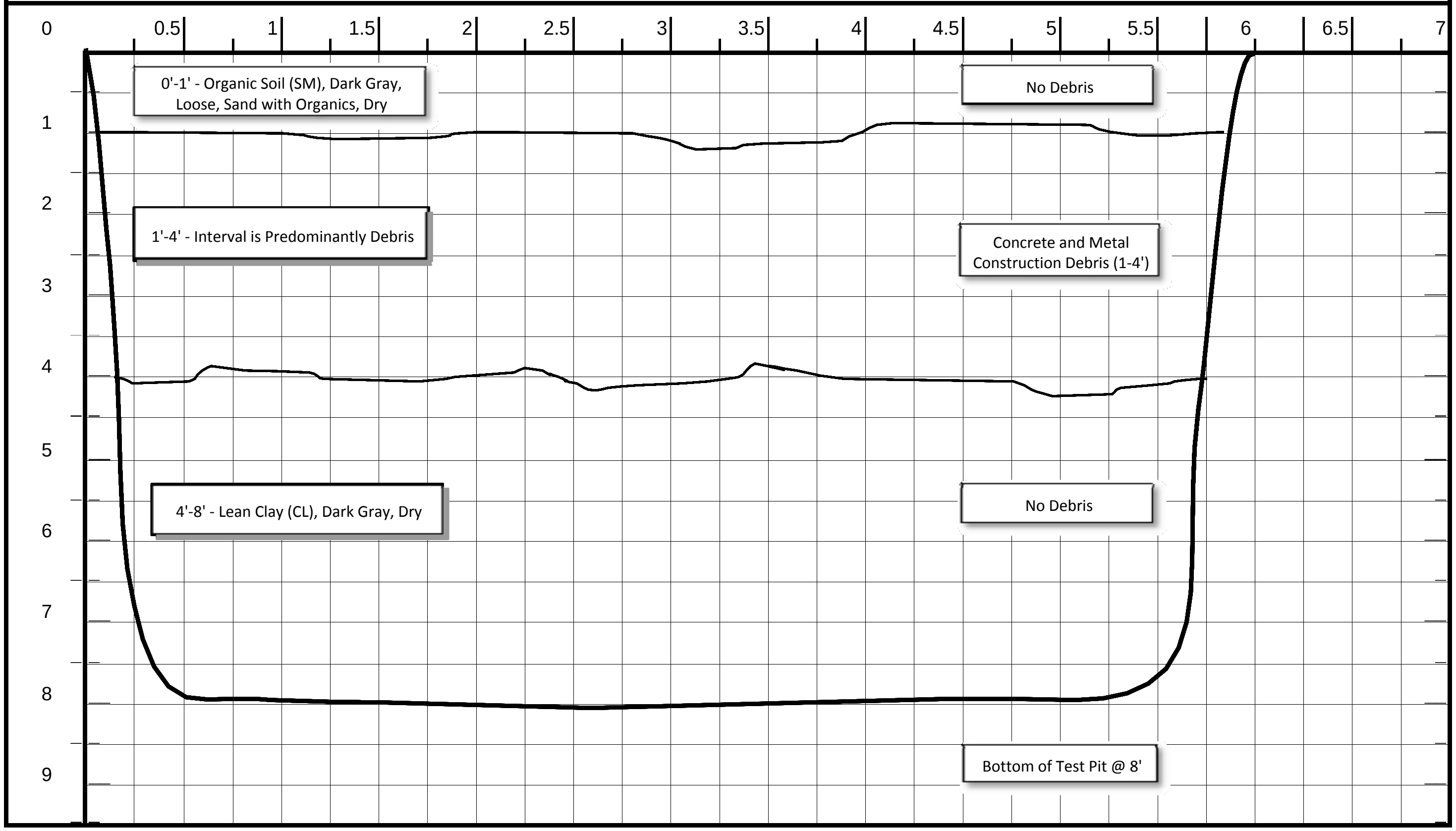
PROJECT NUMBER	TEST PIT NUMBER	
359831.SI.SI	CAA03-TP04	SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost
ELEVATION : 14.51 ft above msl CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/27/09
WATER LEVEL : N/A APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 8 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



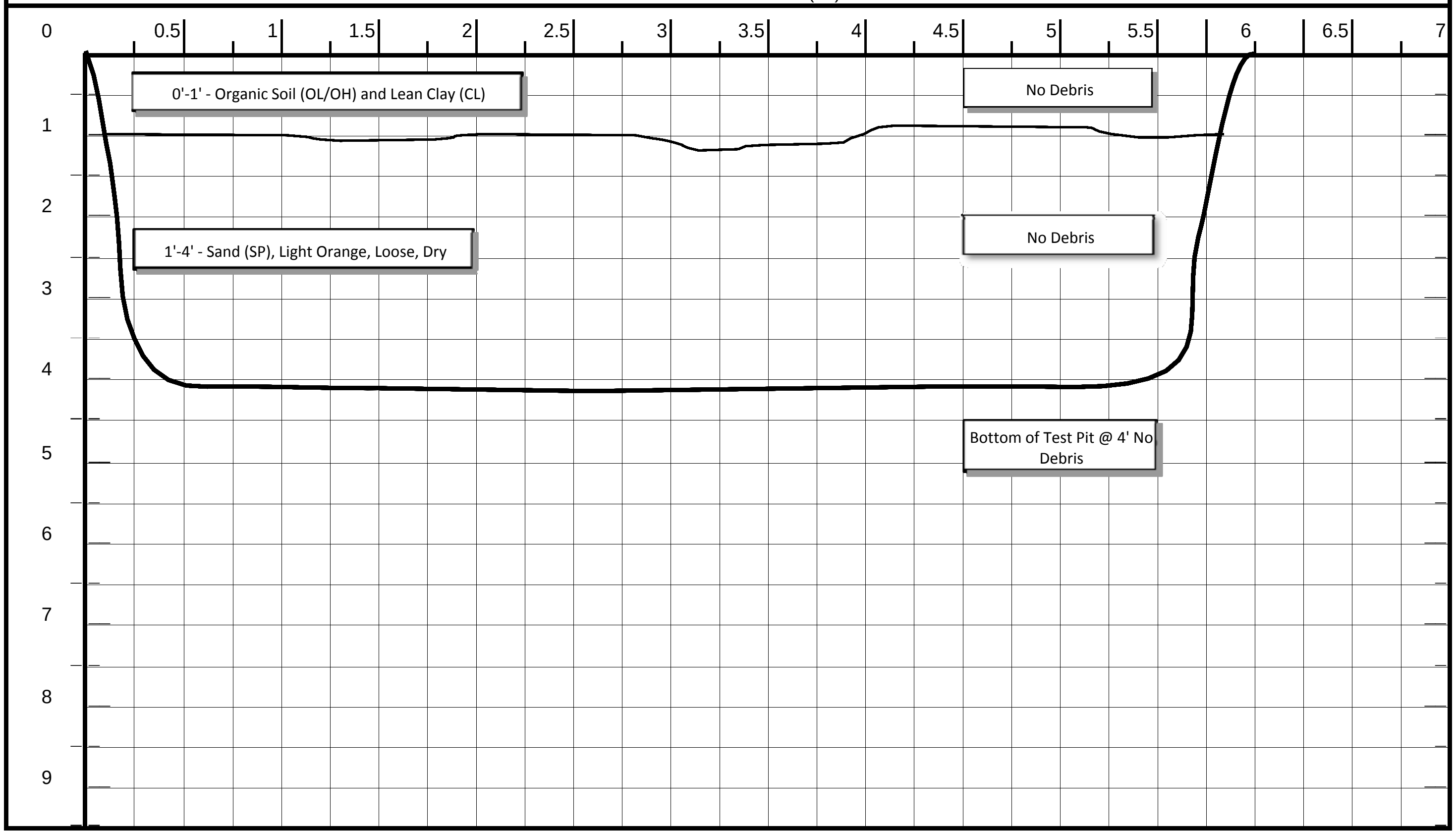
CH2MHILL	PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAA03-TP05 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost
ELEVATION : 18.59 ft above msl CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/27/09
WATER LEVEL : N/A APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL	PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAA03-TP06 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost

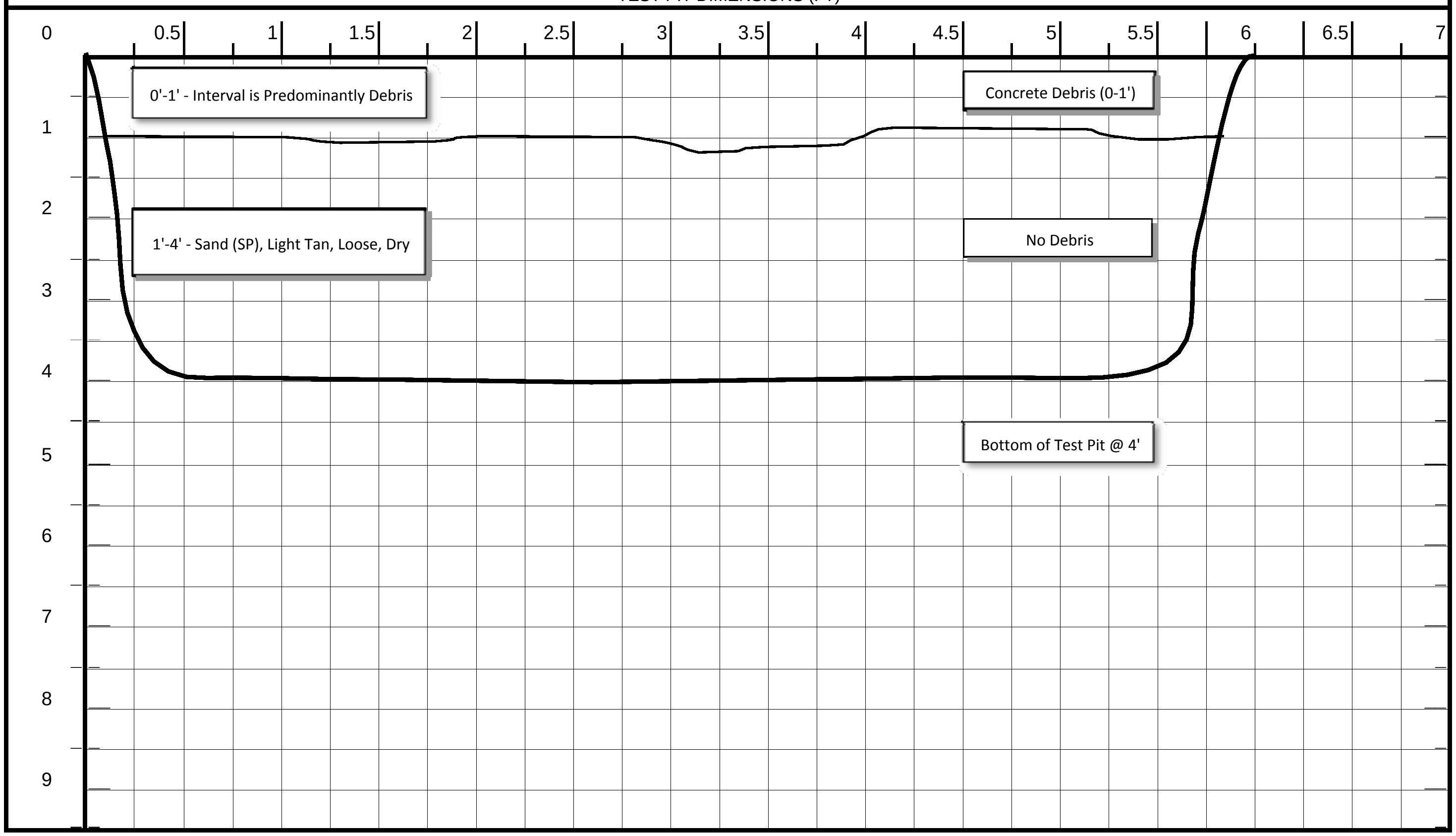
ELEVATION : 21.66 ft above msl CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/27/09

WATER LEVEL : N/A APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



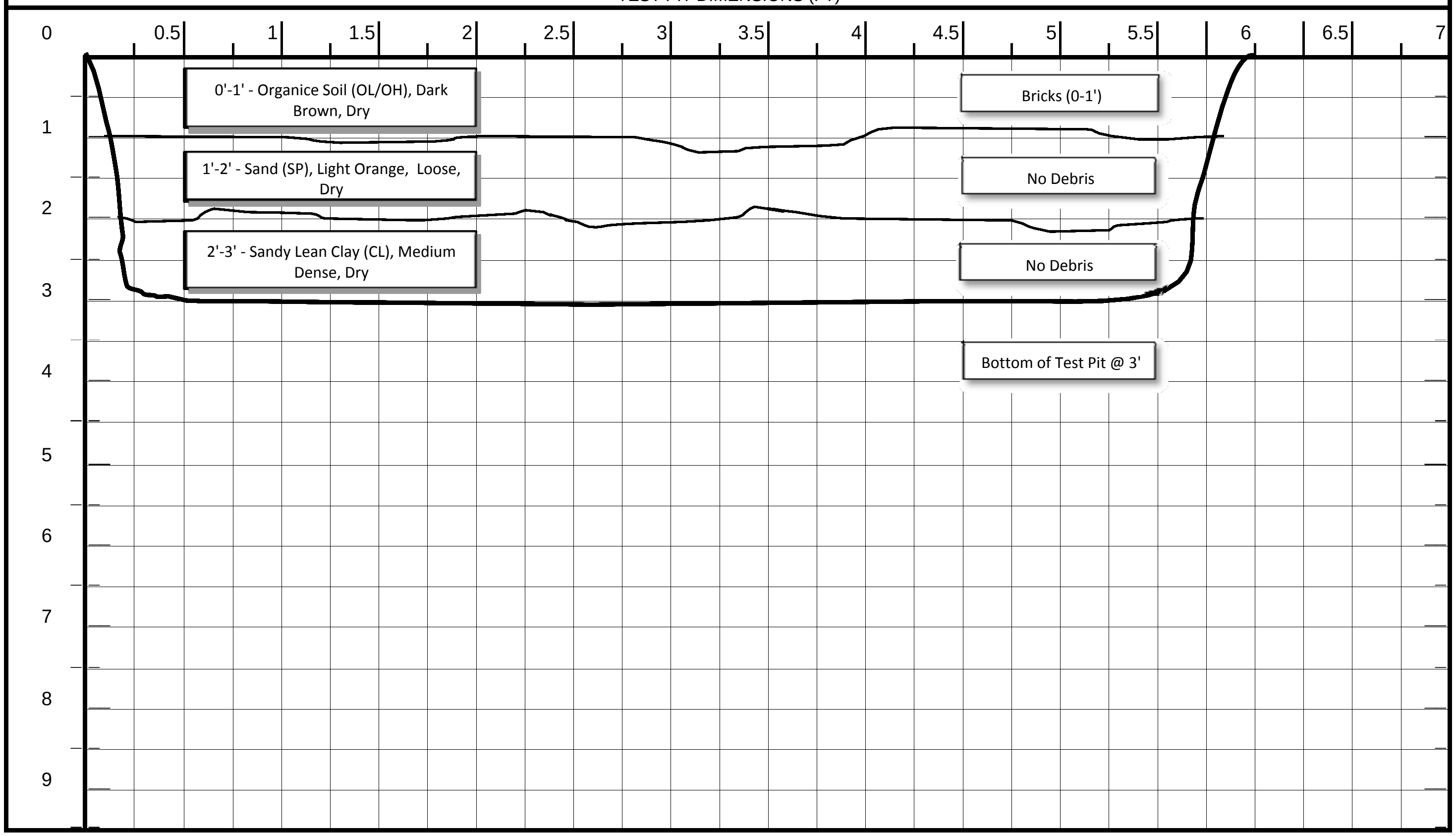
	PROJECT NUMBER	TEST PIT NUMBER
CH2MHILL	359831.SI.SI	CAA03-TP07 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost
ELEVATION : 21.16 ft above msl CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/27/09
WATER LEVEL : N/A APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 3 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	**CAA03-TP08** SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost

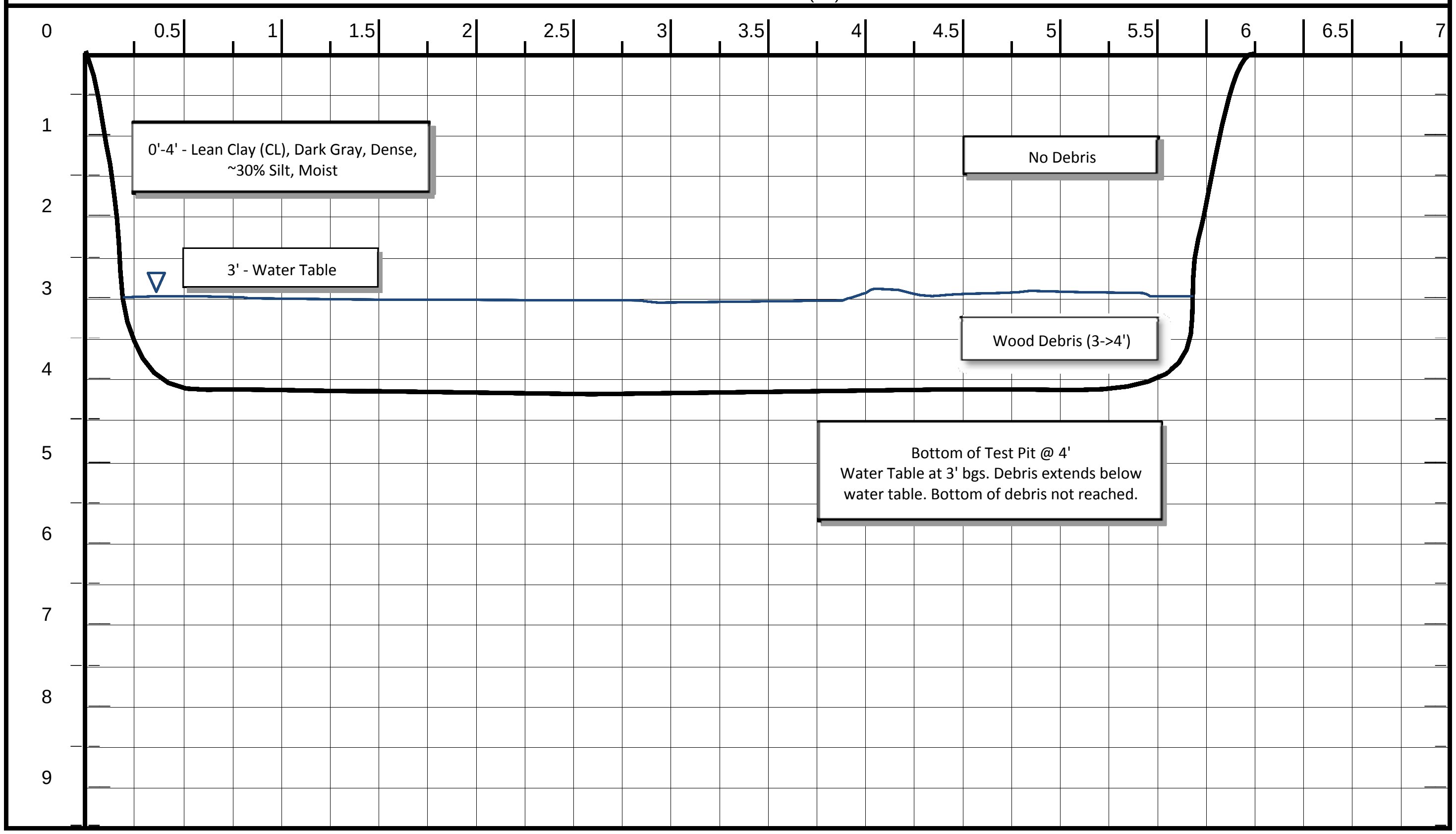
ELEVATION : 12.00 ft above msl CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/27/09

WATER LEVEL : 3 ft APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



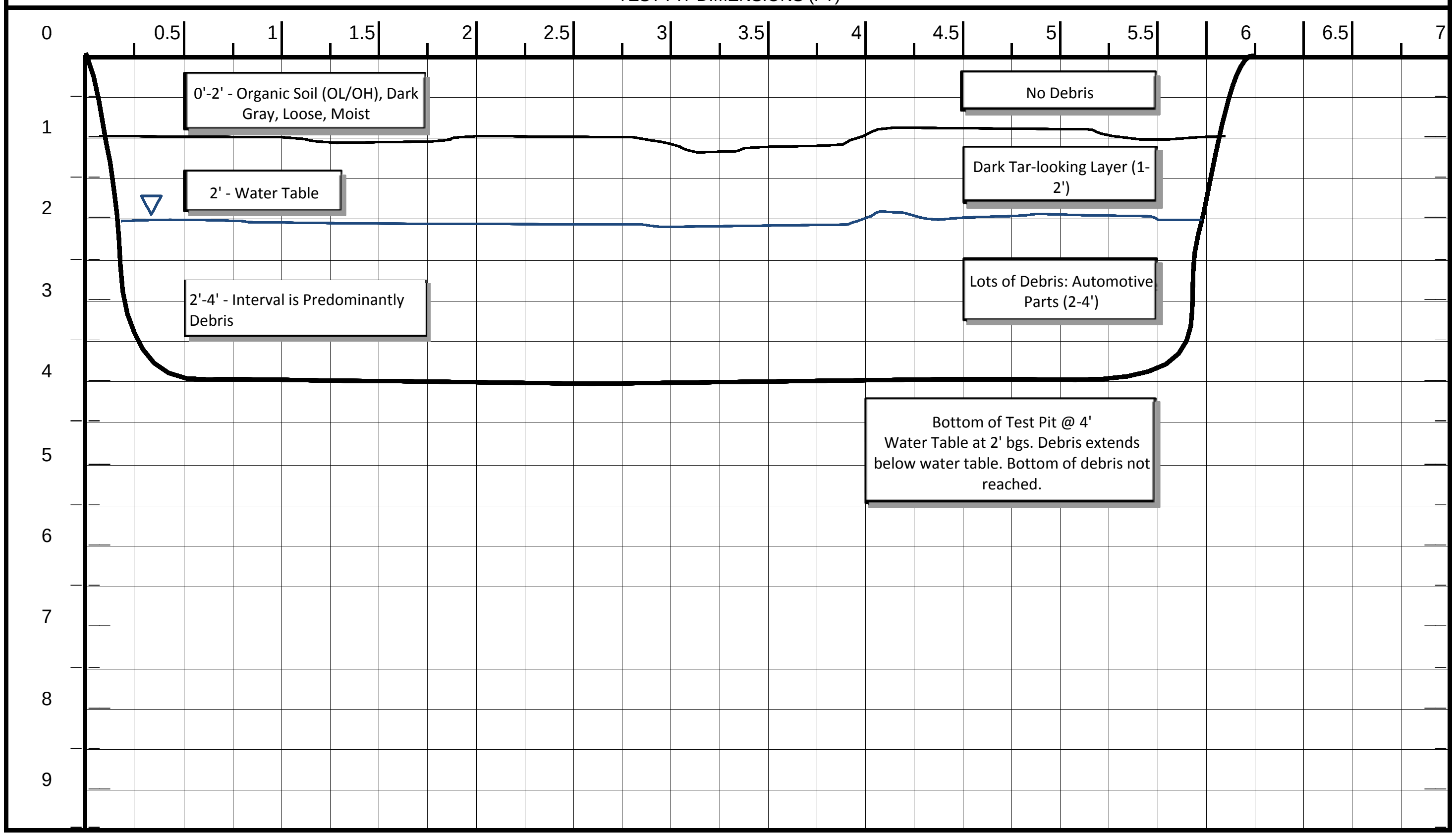
CH2MHILL	PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAA03-TP09 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost
ELEVATION : 11.93 ft above msl CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/27/09
WATER LEVEL : 2 ft APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL

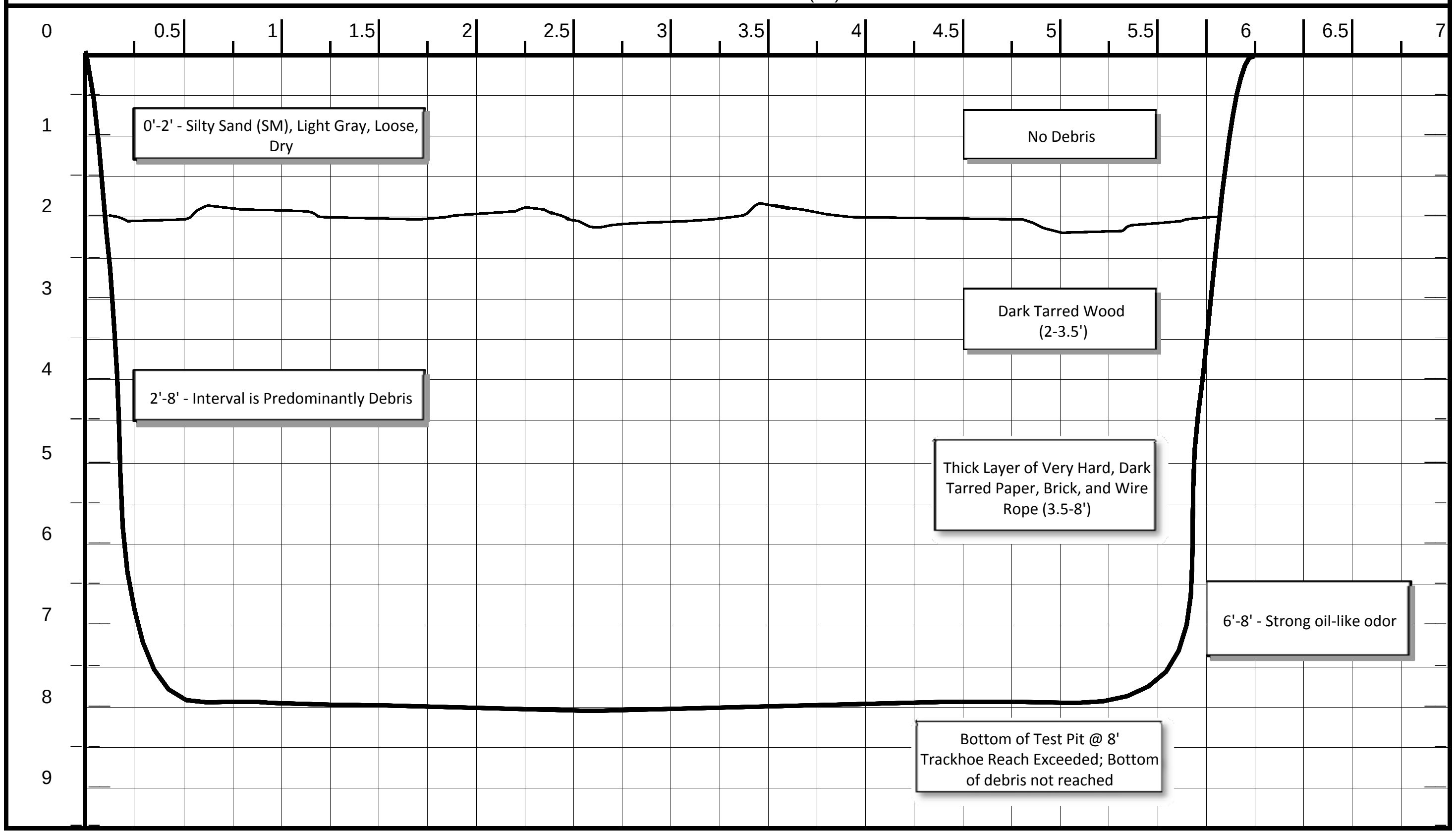
PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP10 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost
ELEVATION : 13.23 ft above msl CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/27/09
WATER LEVEL : N/A APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 8 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



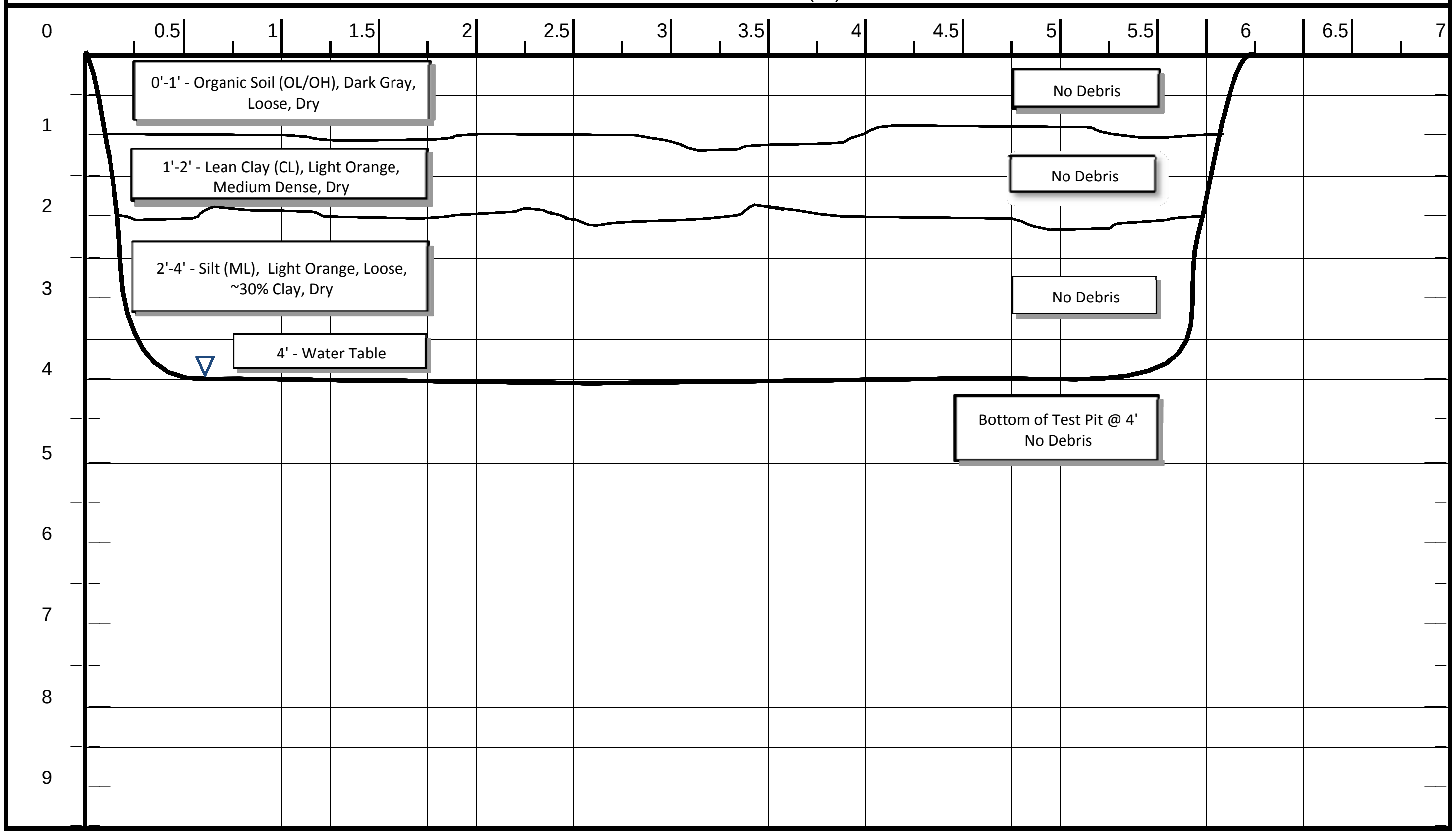
PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAA03-TP11	SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI
LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia
LOGGER : Mark Ost
ELEVATION : 13.41 ft above msl
CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe
DATE EXCAVATED: 10/29/09
WATER LEVEL : 4 ft
APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP12 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

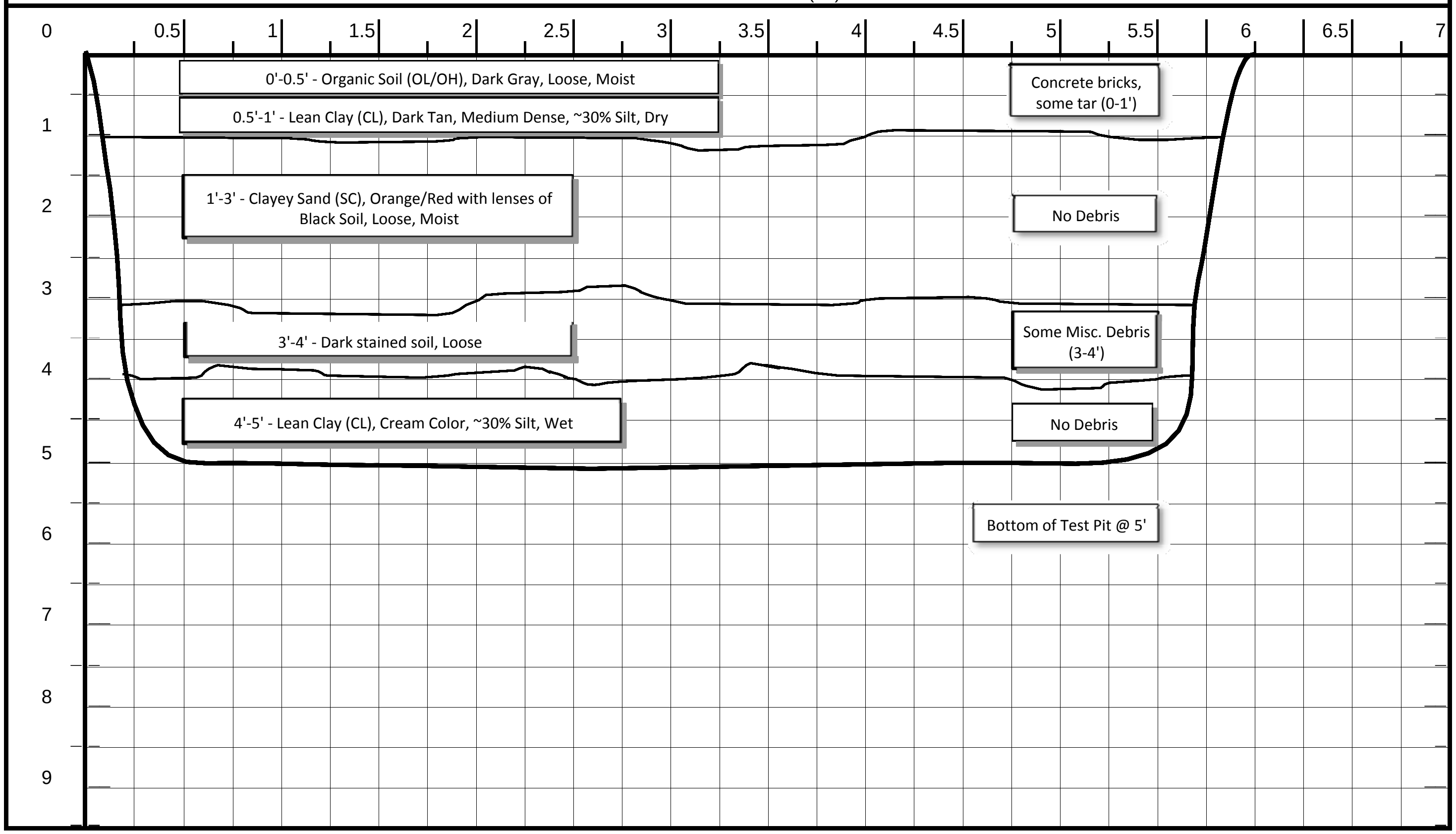
ELEVATION : 14.57 ft above msl | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/29/09

WATER LEVEL : N/A | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAA03-TP13	SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia — LOGGER : Mark Ost

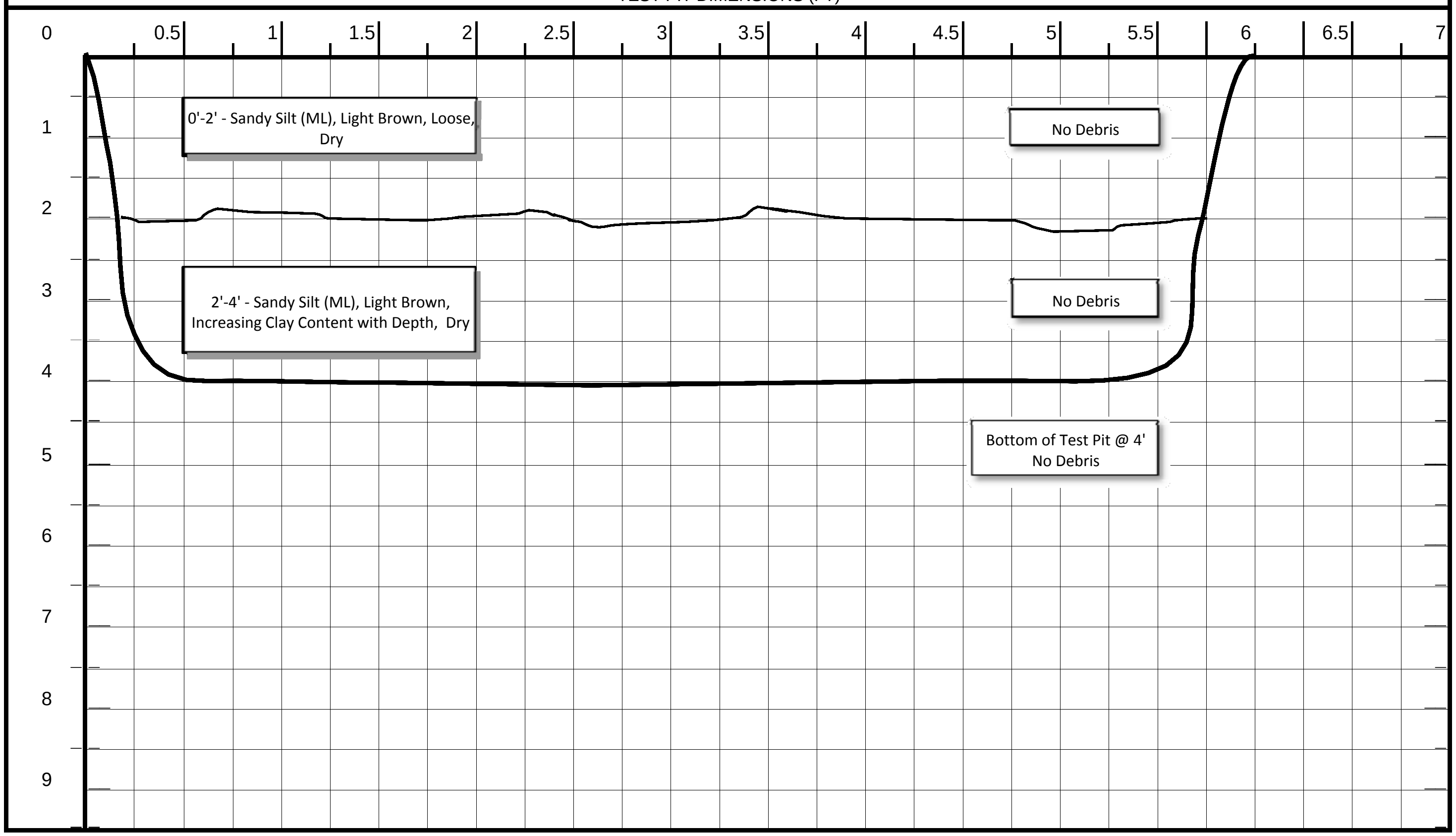
ELEVATION : 16.04 ft above msl — CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe — DATE EXCAVATED: 10/29/09

WATER LEVEL : N/A — APPROX. DIMENS: Length: 6 ft — Width: 3 ft — Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL

PROJECT NUMBER
359831.SI.SI

TEST PIT NUMBER
CAA03-TP14

SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

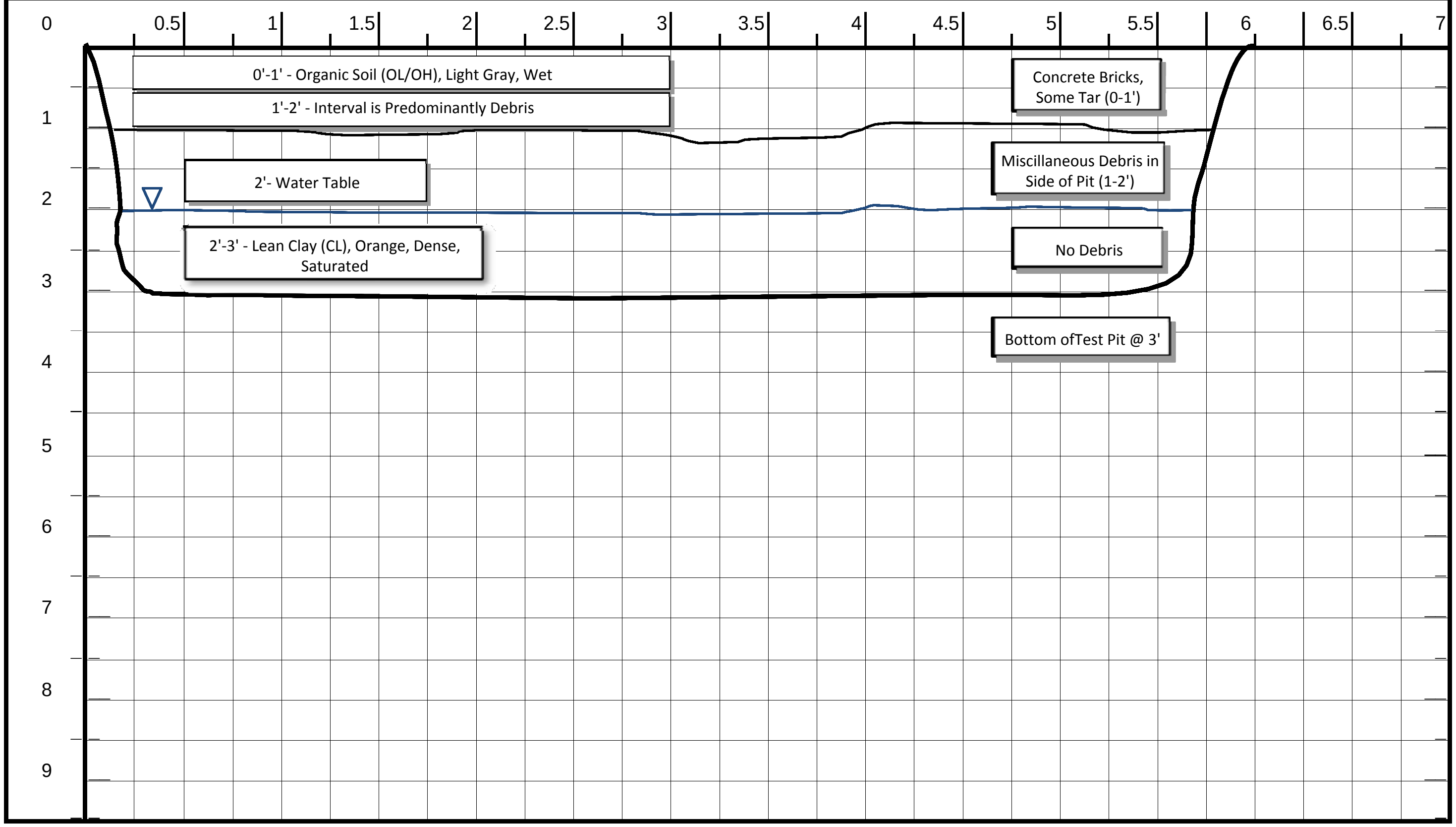
ELEVATION : 11.25 ft above msl | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/29/09

WATER LEVEL : 2 ft | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 3 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP15 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost

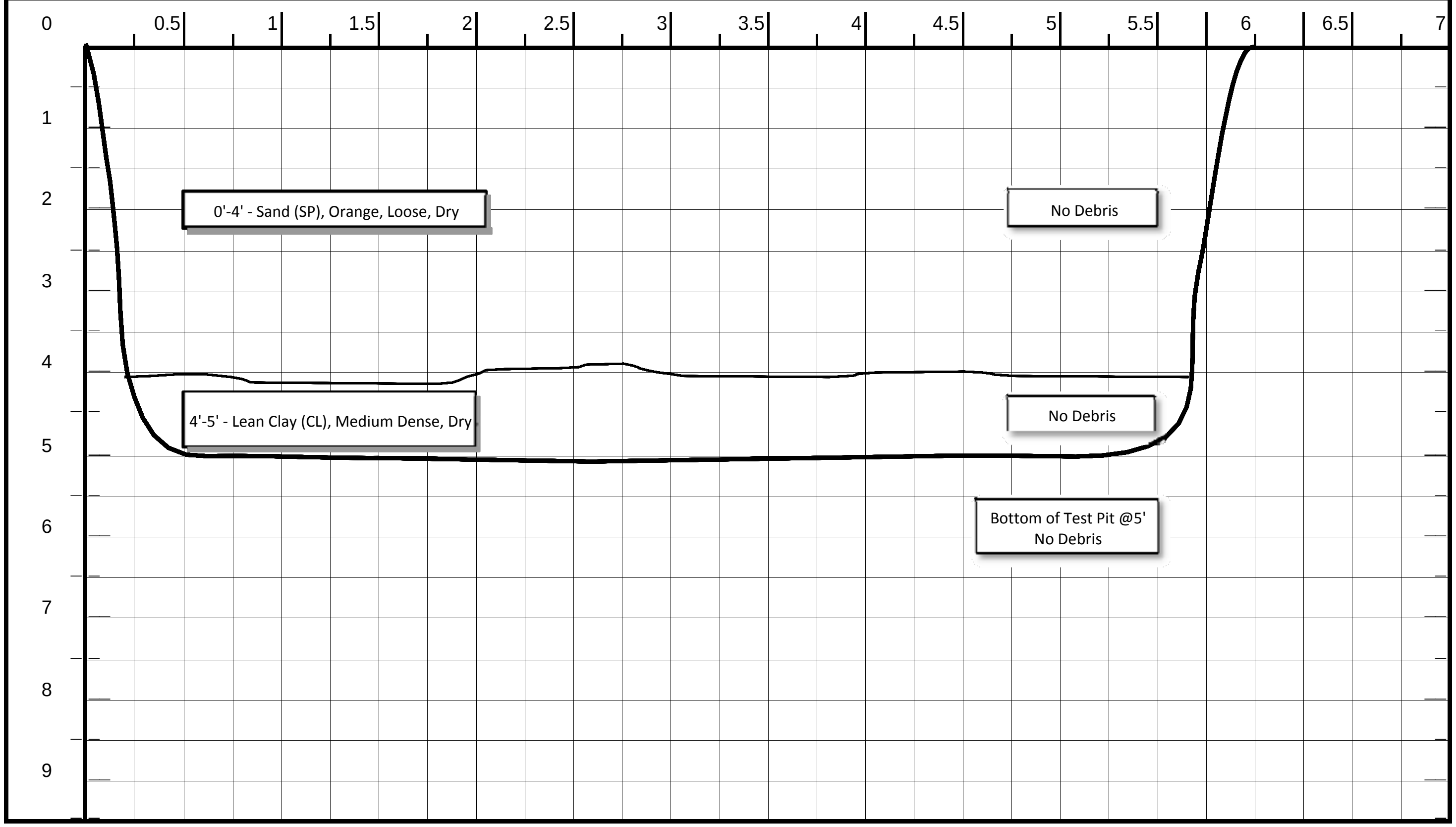
ELEVATION : 14.41 ft above msl CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/29/09

WATER LEVEL : N/A ft APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL	PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAA03-TP16 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost

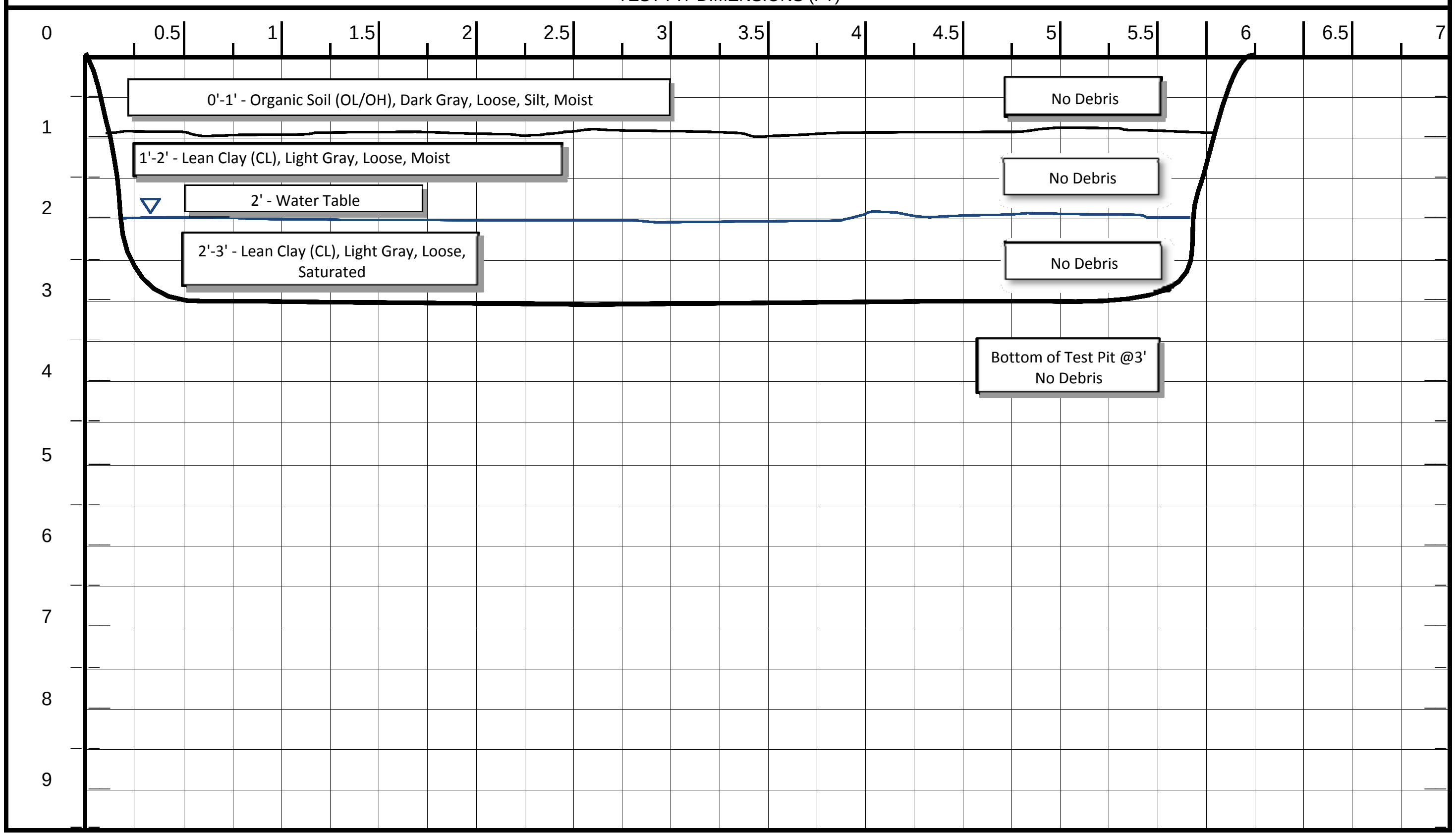
ELEVATION : 12.37 ft above msl CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/29/09

WATER LEVEL : 2 ft APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 3 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL

PROJECT NUMBER
359831.SI.SI

TEST PIT NUMBER
CAA03-TP17

SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

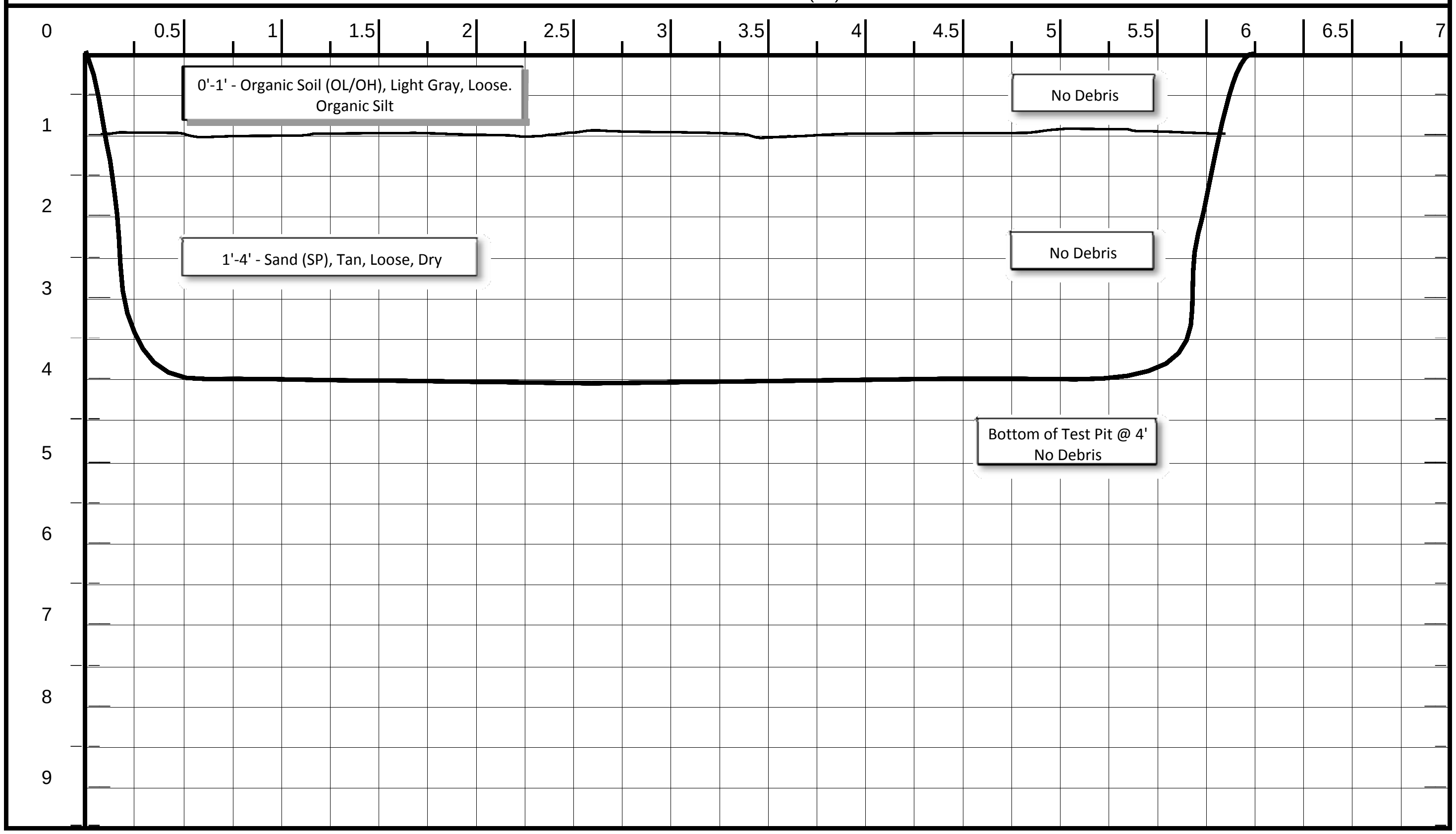
ELEVATION : 15.52 ft above msl | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/29/09

WATER LEVEL : N/A | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL	PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAA03-TP18 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

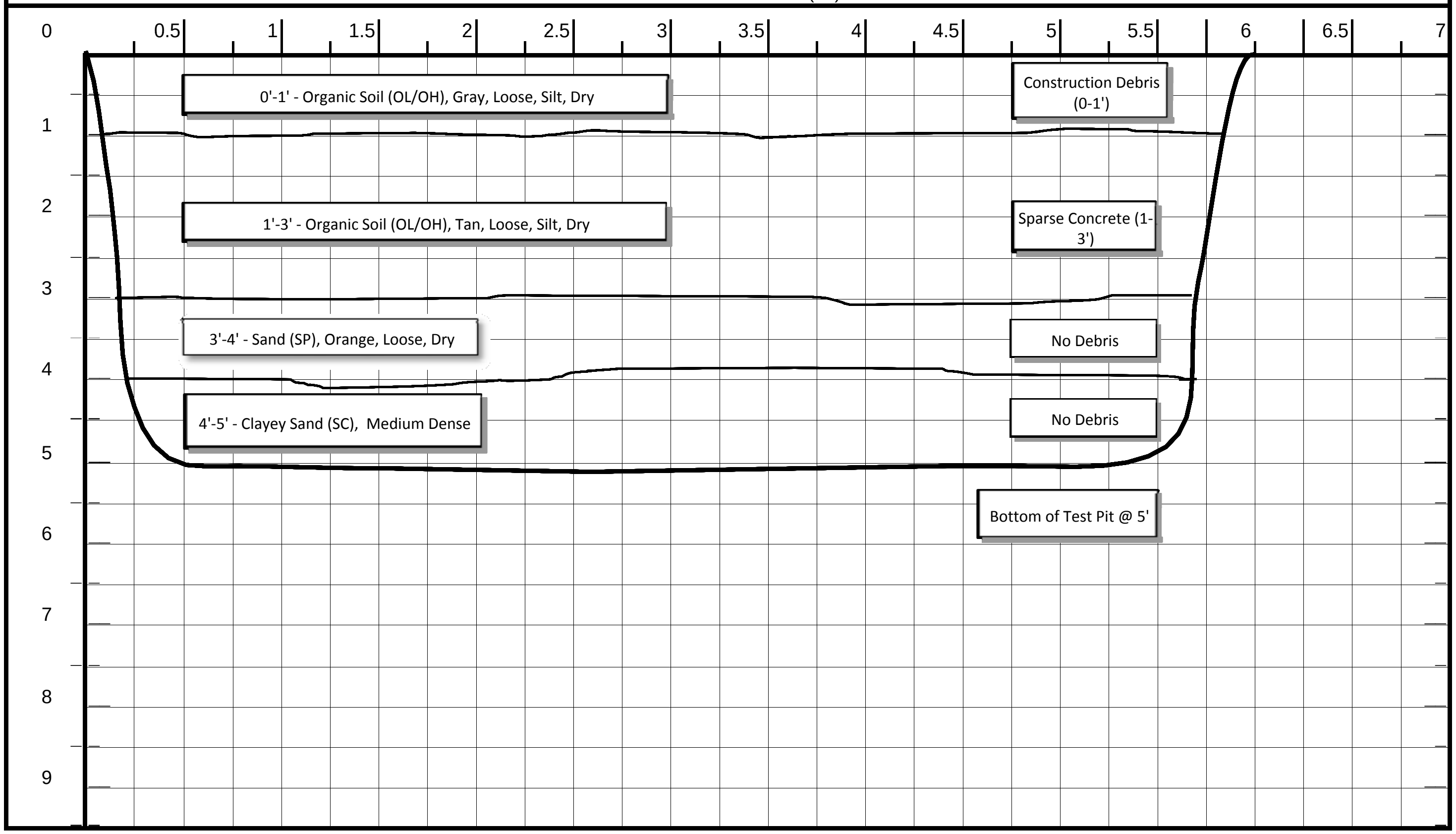
ELEVATION : 15.36 ft above msl | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/29/09

WATER LEVEL : N/A | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL

PROJECT NUMBER 359831.SI.SI

TEST PIT NUMBER CAA03-TP19 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost

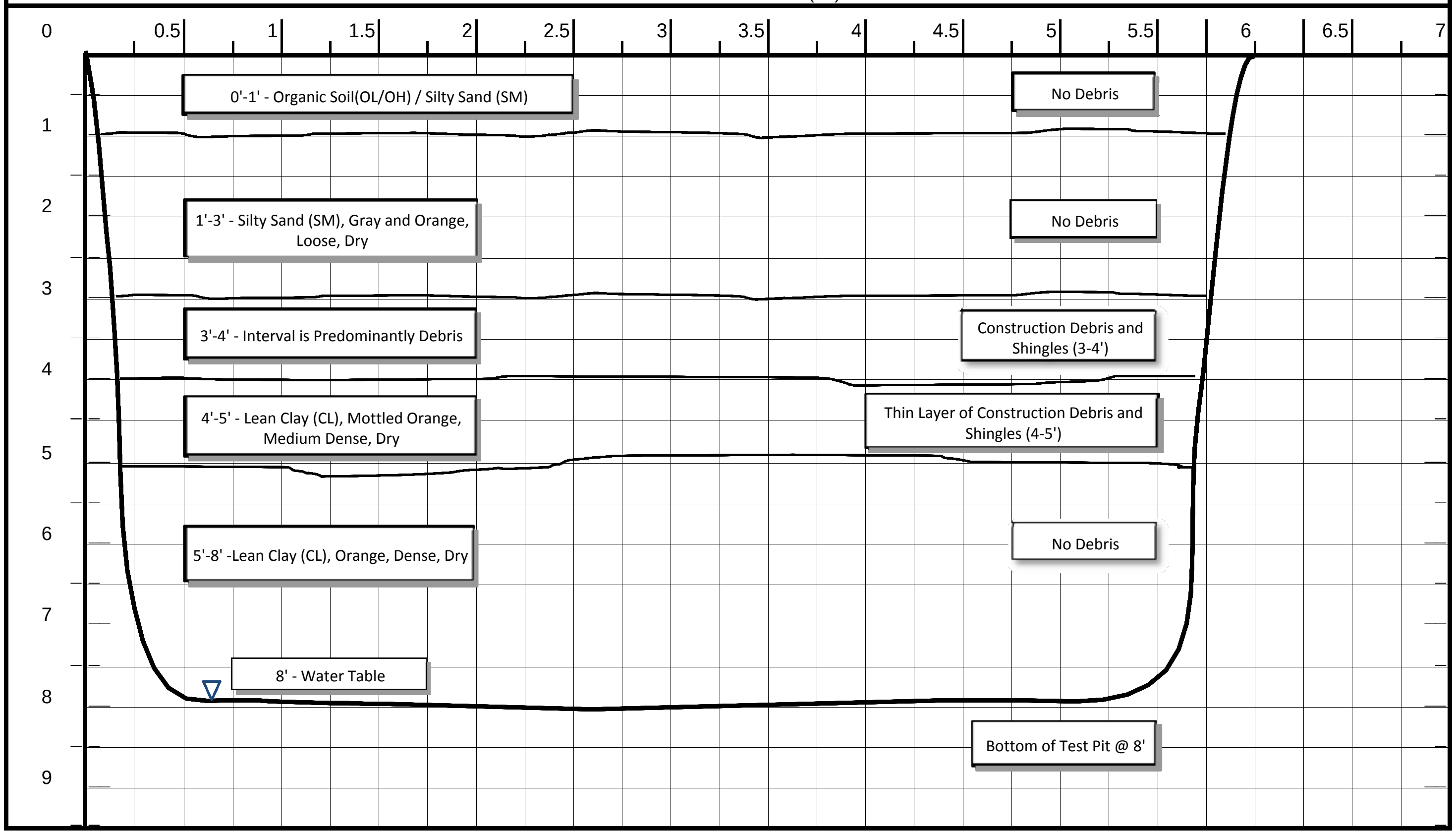
ELEVATION : 16.03 ft above msl CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/30/09

WATER LEVEL : 8 ft APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 8 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL	PROJECT NUMBER **359831.SI.SI**	TEST PIT NUMBER **CAA03-TP20** SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost

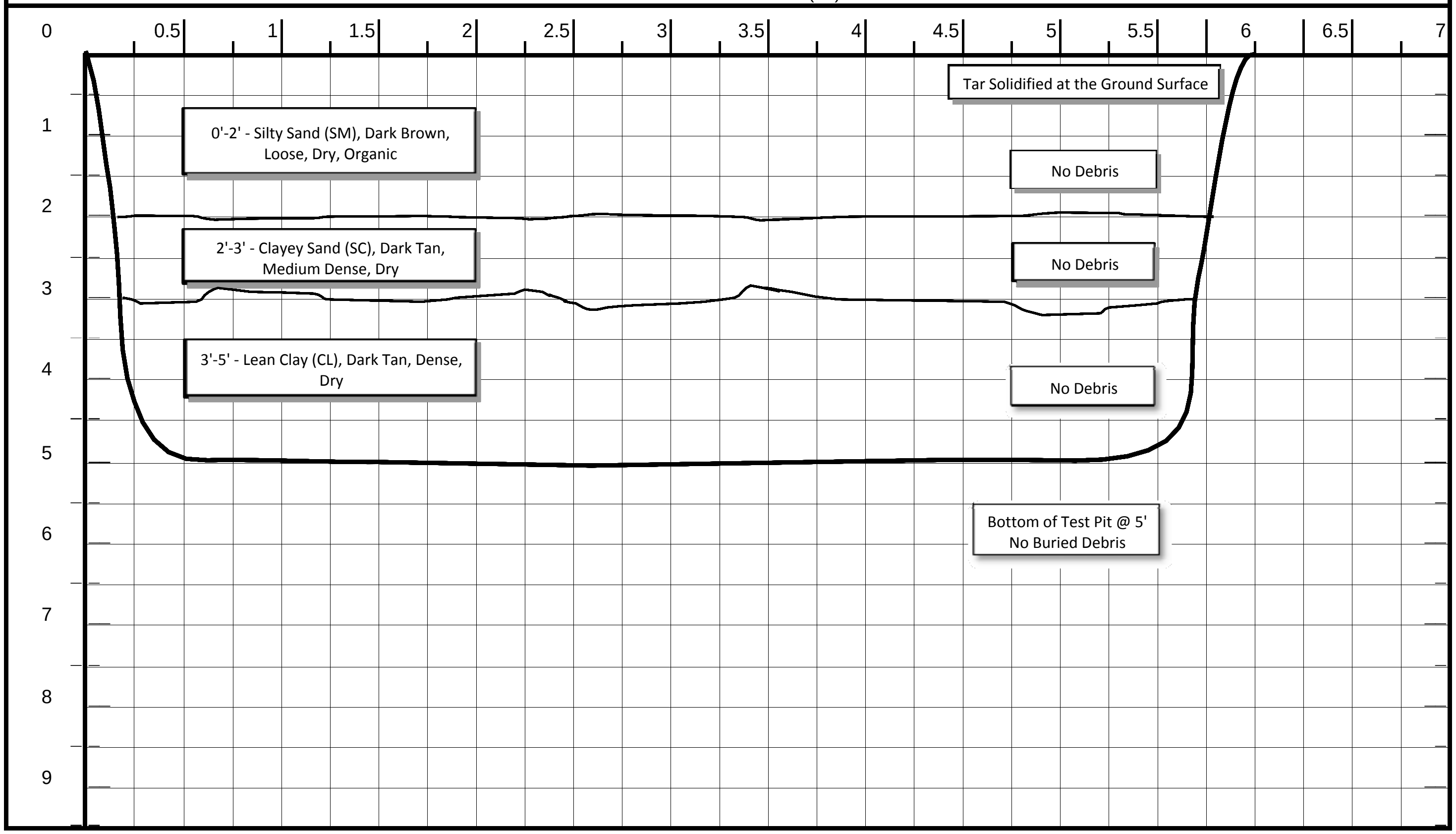
ELEVATION : 19.15 ft above msl CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/30/09

WATER LEVEL : N/A APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP21 SHEET 1 OF 1

CH2MHILL

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia LOGGER : Mark Ost

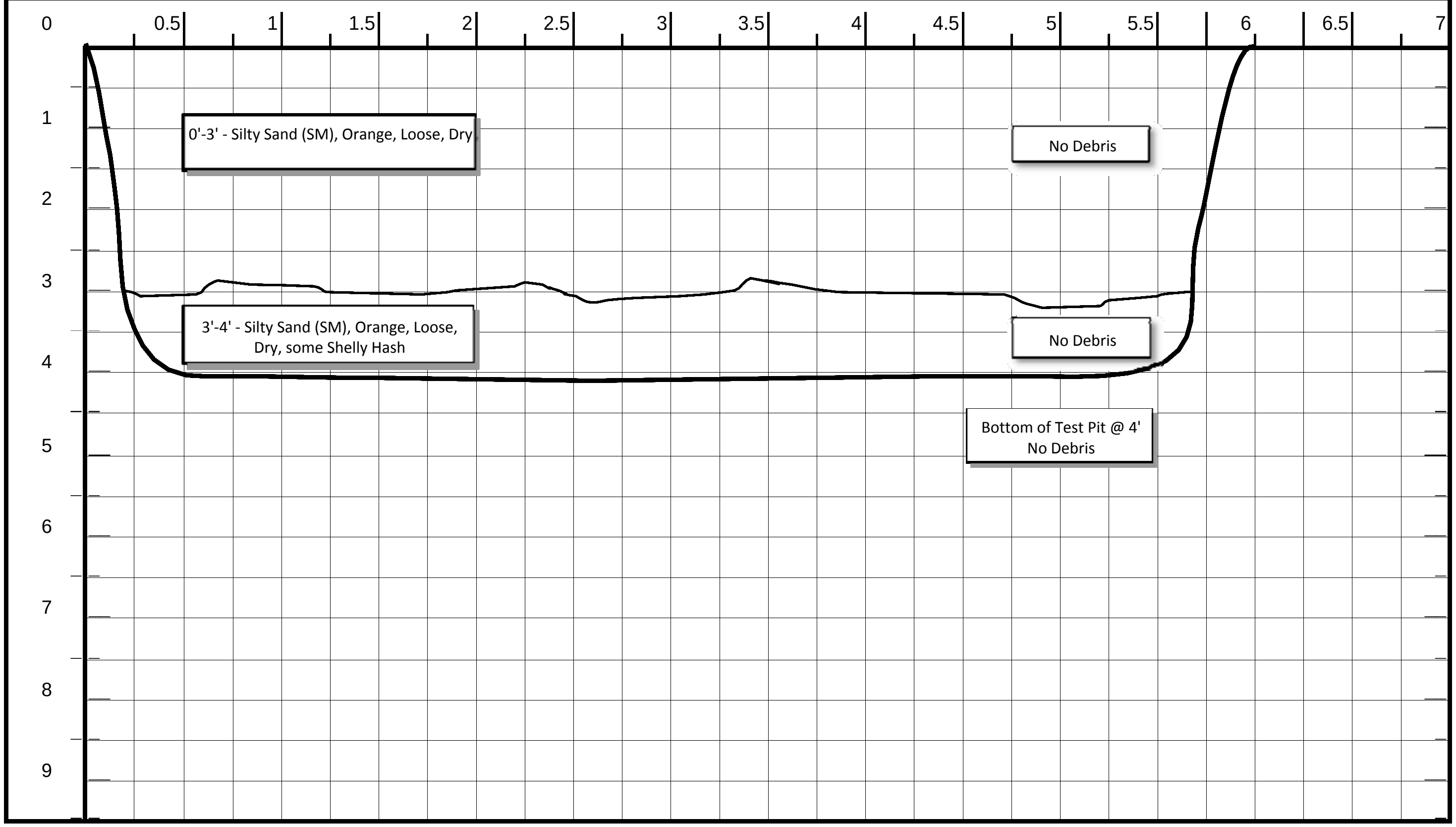
ELEVATION : 17.46 ft above msl CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe DATE EXCAVATED: 10/30/09

WATER LEVEL : N/A APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER
359831.SI.SI	CAA03-TP22 SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia — LOGGER : Mark Ost

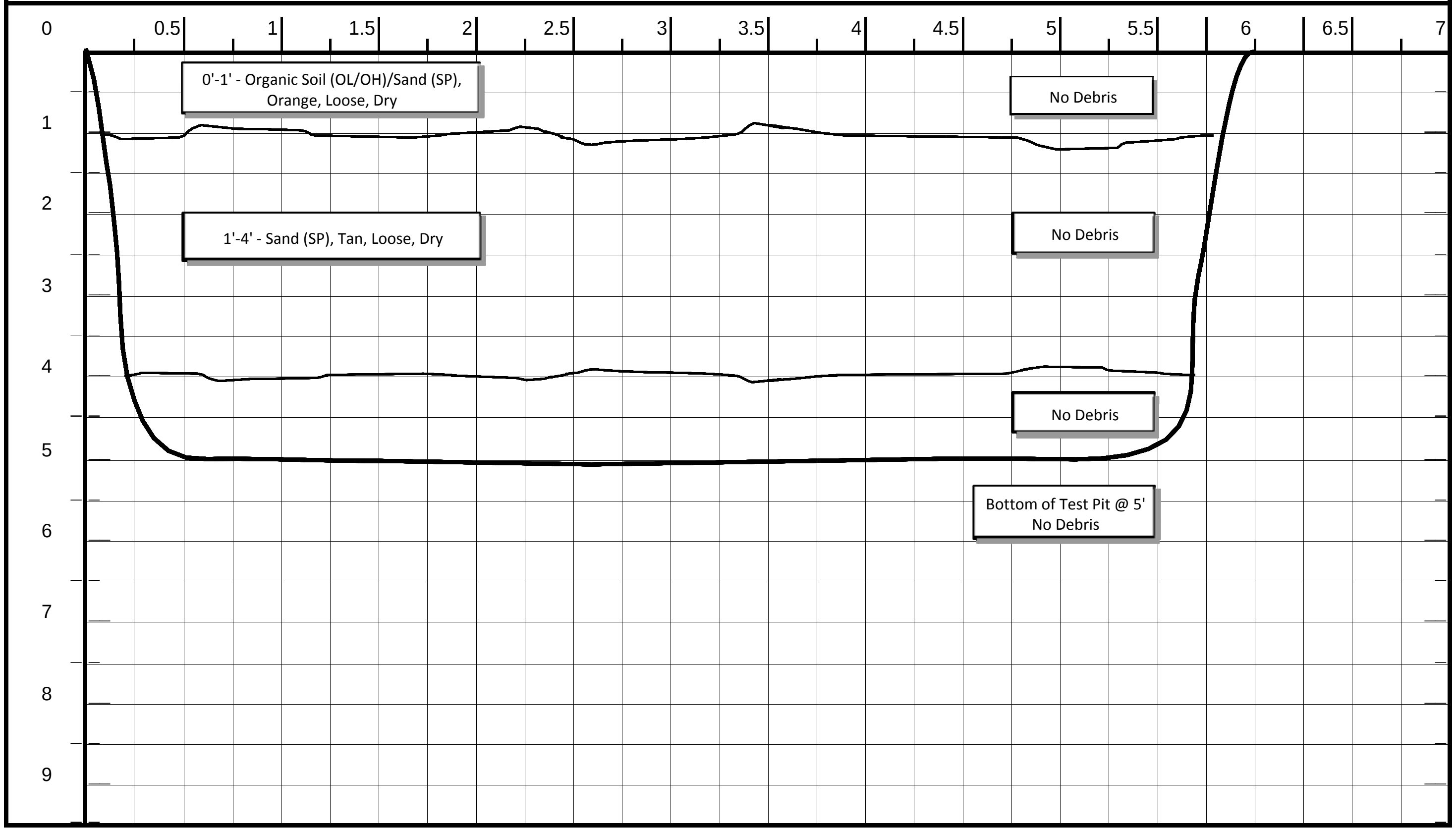
ELEVATION : 17.90 ft above msl — CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe — DATE EXCAVATED: 10/30/09

WATER LEVEL : N/A — APPROX. DIMENS: Length: 6 ft — Width: 3 ft — Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



CH2MHILL	PROJECT NUMBER **359831.SI.SI**	TEST PIT NUMBER **CAA03-TP23** SHEET 1 OF 1
	TEST PIT LOG	

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

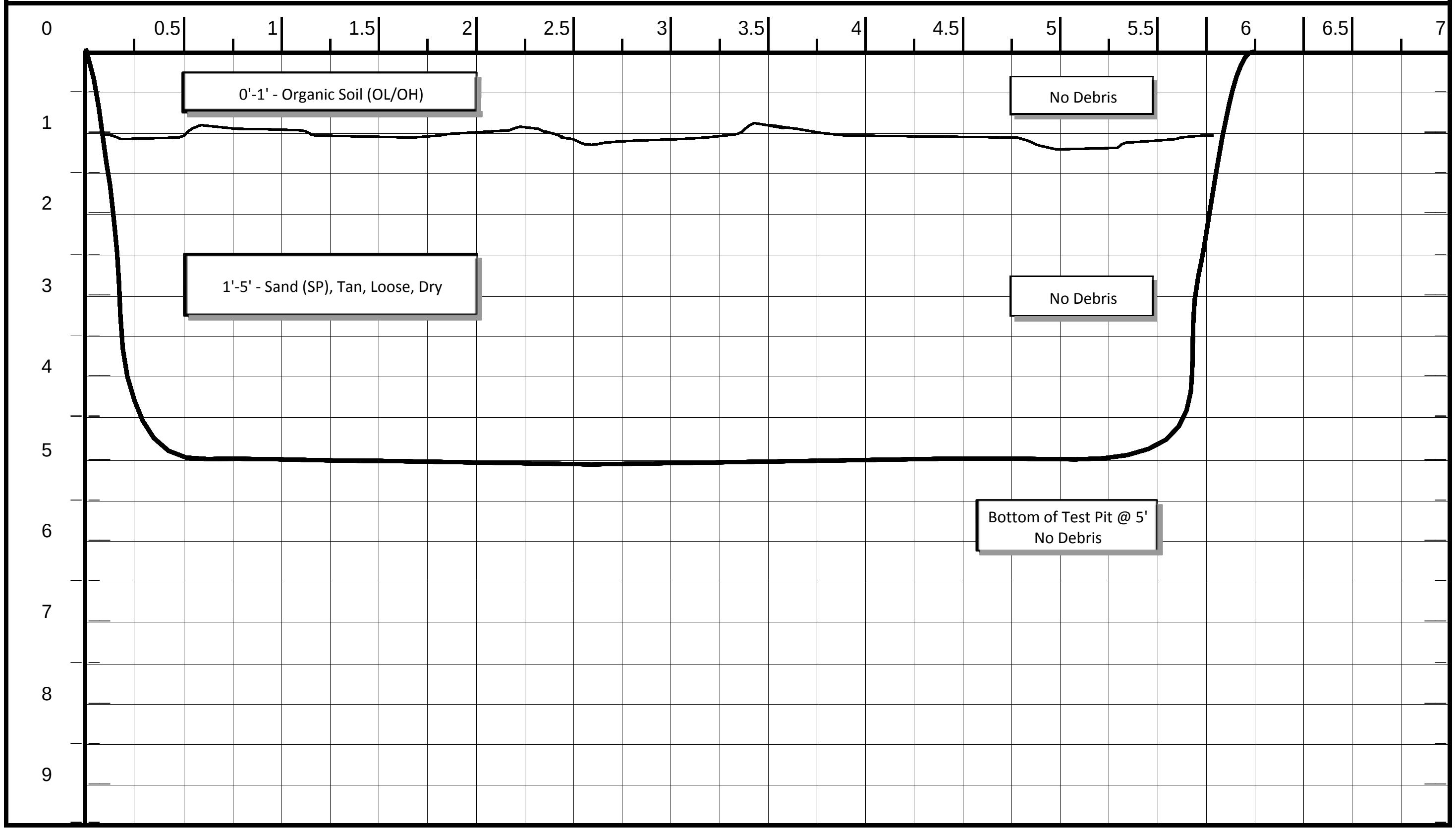
ELEVATION : | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/30/09

WATER LEVEL : N/A | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



PROJECT NUMBER	TEST PIT NUMBER	
359831.SI.SI	CAA03-TP24	SHEET 1 OF 1

TEST PIT LOG

PROJECT : Sites 4, 9 and AOC 3 SI | LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia | LOGGER : Mark Ost

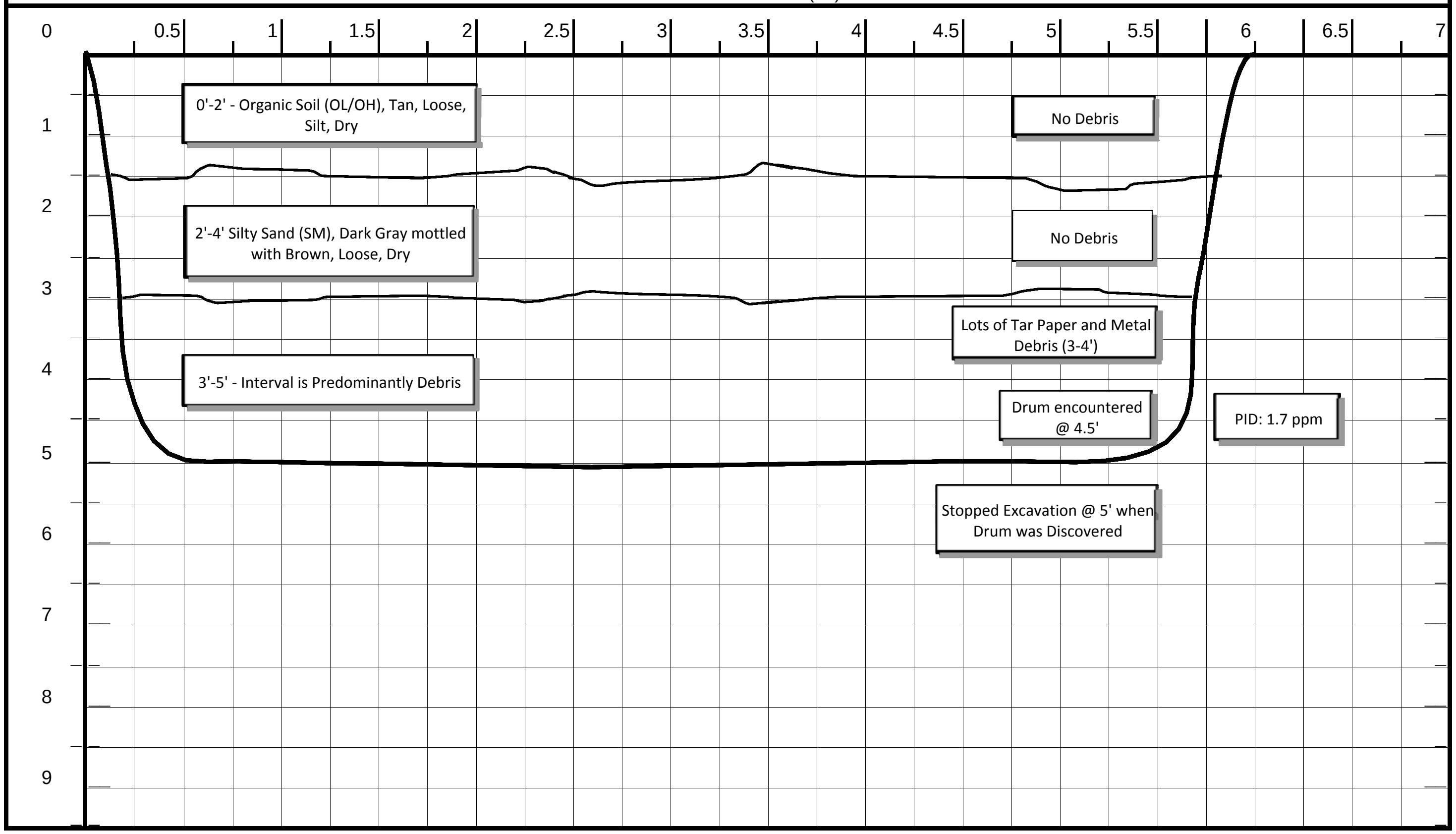
ELEVATION : 15.47 ft above msl | CONTRACTOR : Parratt-Wolff, Inc.

EXCAVATION EQUIPMENT USED : Trackhoe | DATE EXCAVATED: 10/30/09

WATER LEVEL : N/A | APPROX. DIMENS: Length: 6 ft | Width: 3 ft | Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)

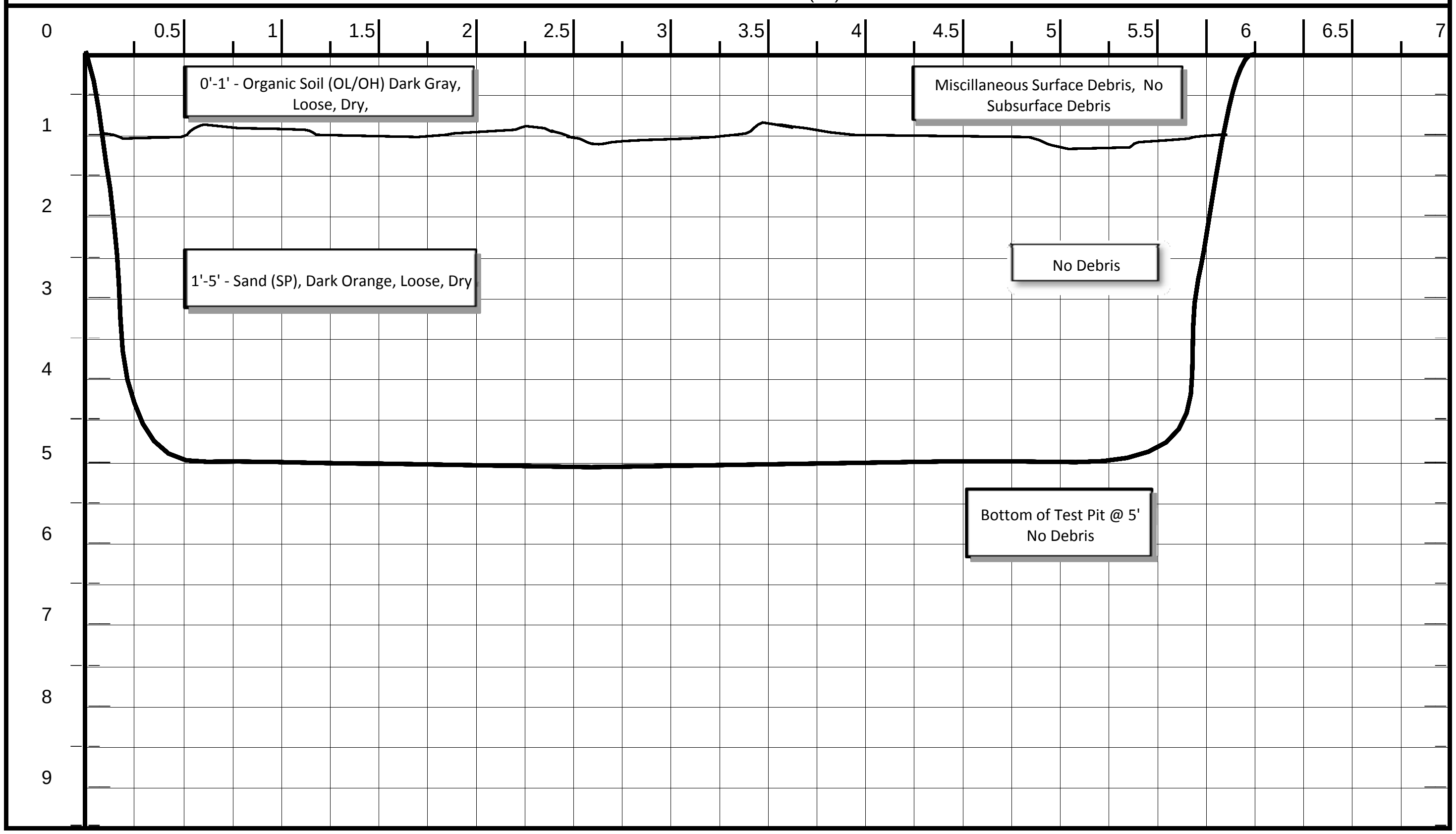


CH2MHILL	PROJECT NUMBER 359831.SI.SI	TEST PIT NUMBER CAS04-TP01 SHEET 1 OF 1
	TEST PIT LOG	

PROJECT : Sites 4, 9 and AOC 3 SI
LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia
LOGGER : Mark Ost
ELEVATION : 18.64 ft above msl
CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe
DATE EXCAVATED: 10/30/09
WATER LEVEL : N/A
APPROX. DIMENS: Length: 6 ft Width: 3 ft Max. Depth: 5 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)

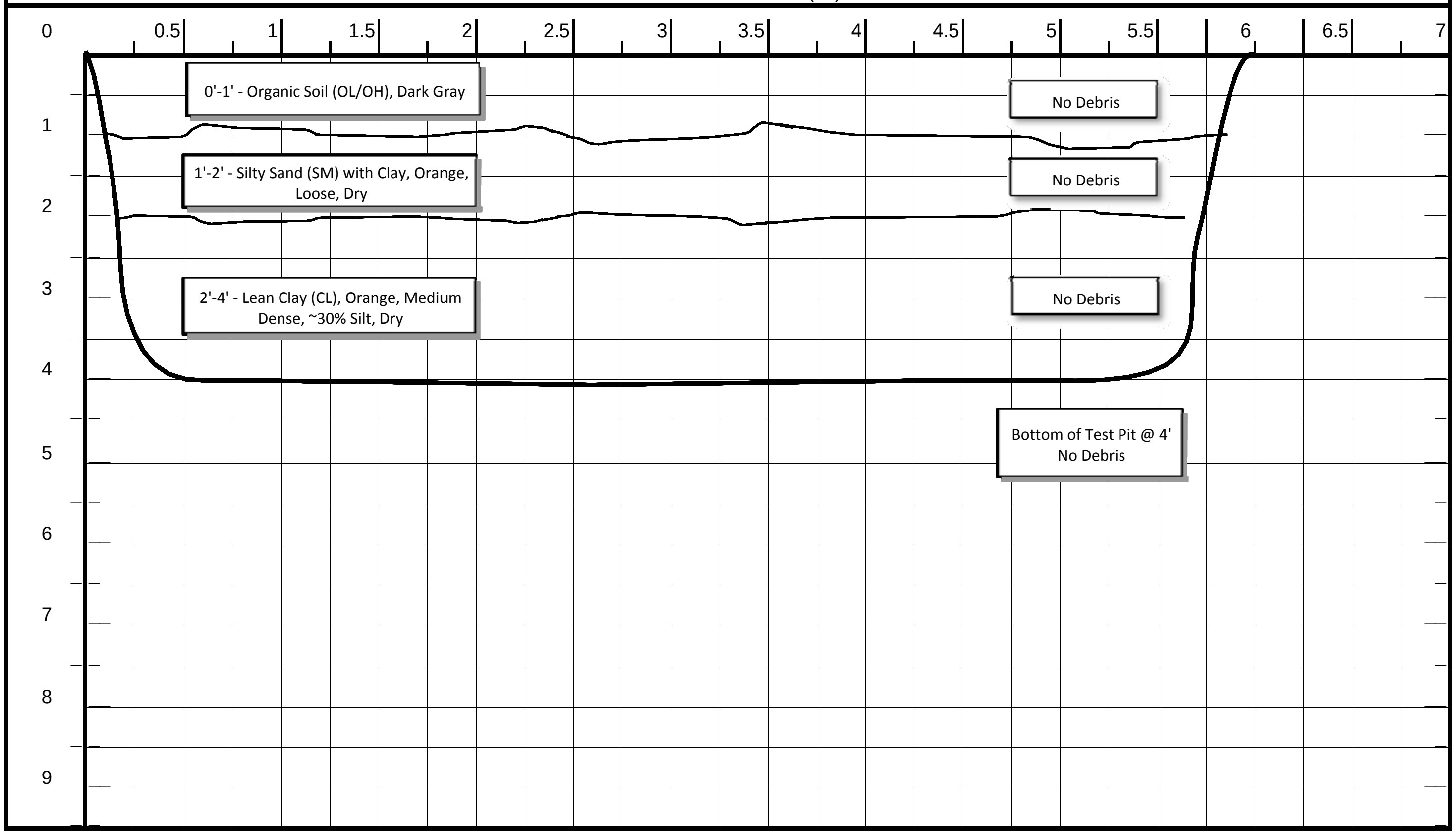


CH2MHILL	PROJECT NUMBER **359831.SI.SI**	TEST PIT NUMBER **CAS04-TP02** SHEET 1 OF 1
	TEST PIT LOG	

PROJECT : Sites 4, 9 and AOC 3 SI   LOCATION : Cheatham Annex, AOC 3 Williamsburg, Virginia   LOGGER : Mark Ost
ELEVATION : 18.16 ft above msl   CONTRACTOR : Parratt-Wolff, Inc.
EXCAVATION EQUIPMENT USED : Trackhoe   DATE EXCAVATED: 10/30/09
WATER LEVEL : N/A   APPROX. DIMENS: Length: 6 ft   Width: 3 ft   Max. Depth: 4 ft

DESCRIPTION	COMMENTS
(I.E., SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY)	(I.E., DIFFULCULTY IN EXCAVATION, RUNNING GRAVEL, CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS, WATER SEEPAGE)

TEST PIT DIMENSIONS (FT)



Appendix D
Photo documentation of AOC 3 Test Pitting

Temporary Storage of Excavated Soil Prior to Refilling and Regrading

Test Pit 04 - Building Material

Test Pit 08 – Wood Construction Debris

Test Pit 09 – Heavy Layer of Tar Paper

Test Pit 09 – Oily Groundwater under Affected Tar Area

Test Pit 19 – Edge of Debris

Test Pit 24 – Lid of First Buried Drum

Test Pit 04 - Building Material

Test Pit 08 – Wood Construction Debris

Test Pit 09 – Oily Groundwater under Affected Tar Area

Test Pit 09 – Heavy Layer of Tar Paper

Test Pit 19 – Vertical Extent of Edge of Debris

Test Pit 24 – Lid of First Buried Drum

Appendix E
Boring Logs

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAS04-GW02	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 6.4 ft — START : 10/28/09 — END : 10/28/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0–2.8					**0'- 2.8'**- Sandy clay (CL) soft, low plasticity, moist	medical waste debris encountered along interval
2.8–4					**2.8' - 4'** - No Recovery	
4–6.5 (W.T. at 6.4)					**4'- 6.5'**- Silty Sand (SM) yellowish brown (10 YR 5/6) moist, loose, non-plastic fines, poorly graded. Shell gravel and trace medical waste debris.	medical waste debris encountered along interval
6.5–8					**6.5'- 8'** - Silty sand (SM) low/med plasticity, med. dense to dense	
8–19.5					**8'- 19.5'** - Silty sand (SM) light yellowish-brown (2.5YR 6/4), wet, medium sand, very loose to loose. Mottled greenish-grey from **8'-9'**. Fine shell debris becoming larger below **12'** bgs.	
19.5–20					**19.5'- 20'** - SAA, dark yellowish-brown (10YR 5/6), dense	
					End macrocore sampling at 20' bgs	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAS04-GW03	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI LOCATION Cheatham Annex

ELEVATION : DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 8.2 ft START : 10/27/09 END : 10/27/09 LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0					**0'- 0.4'**- Silty sand (SM) dark yellowish-brown (10YR 4/4), moist loose, fine grained	
1–6					**0.4' - 6'** - Silty sand (SM) yellowish-brown (10YR 5/6) dry, loose, fine-medium sand, trace roots.	
6–7					**6'- 7'** - SAA low/med plasticity, moist, 30% shell hash, non-plastic fines	
W.T. at 8.2; 9–14					**7'- 14'** - Silty sand (SM) light yellowish-brown (2.5Y 6/3), moist to **8.5'** and wet below, loose, shell hash	
15–20					**14'- 20'** - Silty sand (SM) brownish-yellow (10YR 6/6) and light olive-brown (2.5Y 5/4), wet, very loose to loose, fine-medium sand, 15-20% shell hash.	
					End macrocore sampling at 20' bgs	

PROJECT NUMBER	BORING NUMBER	
	CAS04-GW04	SHEET 1 OF 1

SOIL BORING LOG

PROJECT :
LOCATION Cheatham Annex
ELEVATION :
DRILLING CONTRACTOR : Parratt Wolff
DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves
WATER LEVELS :
START : 10/27/09
END : 10/27/09
LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0					**0'-0.5'**- Silty sand (SM) light gray (10YR 7/1), dry, fine sand, very loose, non-plastic fines	
1						
2						
3					**0.5'- 5'**- Silty sand (SM) SAA except for color brownish-yellow (10YR 6/8)	
4						
5						
6						
7					**5'- 7.5'**- Clayey sand (SC) dark yellowish-brown (10YR 4/6), dry, very stiff, low to medium plasticity, fine to medium grained sand	
8						
9					**7.5'- 10.5'** - Silty sand (SM) dark yellowish-brown (10YR 4/6), moist, loose, non-plastic fines w/ fine to medium grained sand	
▽ **W.T. at 9.8**						
11					**10.5'-11.2'** - Silty sand (SM) greenish gray (GLEY 1 5/5GY) moist med-sand, very loose, 15 % shell fragments.	
12						
13						
14						
15						
16						
17						
18					**11.2'-24'** - Silty sand (SM) light yellowish brown (2.5 Y 6/4) wet, very loose, fine to coarse, whole partial shells present.	
19						
20						
21						
22						
23						
24						
					End macrocore sampling at 24' bgs	

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAS09-GW01	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 8.4 ft — START : 10/29/09 — END : 10/29/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0–1.5					**0' - 1.5'** - Silty sand (SM) olive-brown (2.5Y 4/3) moist, loose	Limestone gravel for first 1.5"
1.5–4.3					**1.5' - 4.3'** - Sandy clay (CL) dark yellowish brown (10YR 4/4) dry, very stiff, medium-high plasticity, fine grained sand	
4.3–7.5					**4.3'- 7.5'** - Clay (CL) yellowish-brown (10YR 5/6), moist, high plasticity, stiff, traces of strong brown mottling	
7.5–17.5 (W.T. at 8.4)					**7.5'- 17.5'** - Silty sand (SM) yellowish-brown (10YR 5/6), wet, loose to medium dense, 30-40% shell hash.	
17.5–20					**17.5' - 20'** - Silty sand (SM) greenish-grey (GLEY1 5/5GY) wet, very loose to loose, medium sand, 15-20% large shell hash.	
					End macrocore sampling at 20' bgs	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAS09-GW02	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 7.7 ft — START : 10/29/09 — END : 10/29/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0–1					**0' - 1'** - Silty sand (SM) olive-brown (2.5Y 4/3) moist, very loose, non-plastic fines.	Limestone gravel for first 1.5"
1–4.5					**1' - 4.5'** - Sandy clay (CL) dark yellowish brown (10YR 4/4) moist to dry, very stiff, medium-high plasticity, fine grained sand	
4.5–8 (W.T. at 7.7)					**4.5'- 8'** - Clay (CL) yellowish brown (10YR 5/6) moist to dry, very stiff, high plasticity	
8–18.5					**8'- 18.5'** - Silty sand (SM) yellowish-brown (10YR 5/6), wet, nonplastic fines, fine to medium sand, 30% shell hash	
18.5–20					**18.5' - 20'** - Silty sand (SM) greenish-grey (GLEY1 5/5GY) wet, very loose to loose, medium sand, 20% large shell hash.	
					End macrocore sampling at 20' bgs	

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAS09-GW03	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 8.3 ft — START : 10/30/09 — END : 10/30/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0–1					**0' - 1.6'** - Silty sand (SM) greyish-brown (10YR 5/2) moist, very loose to loose, non-plastic, fine to medium grained sand	
2–3					**1.6' - 3.7'** - Sandy clay (CL) dark yellowish-brown (10YR 4/4) dry, stiff, high plasticity, fine sand	
4–7					**3.7'- 7.5'** - Clay (CL) yellowish-brown (10YR 5/6) and light olive-grey (5Y 6/2), dry, stiff, high plasticity	
8					**7.5' - 8.2**' - SAA except 20-25% shell hash	
W.T. at 8.3; 9–18					**8.2'- 18.7'** - Silty sand (SM) yellowish-brown (10YR 5/6), wet, very loose to loose, 30-40% shell hash, medium sand, non-plastic fines, gravel layer of shell at **13'**	
19–20					**18.7' - 20' -** Silty sand (SM) greenish-grey (GLEY1 5/5GY) wet, loose, medium sand, 15% large shell hash.	
					End macrocore sampling at 20' bgs	

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	**CAS09-GW04**	SHEET 1 OF 1

CH2MHILL

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex
ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff
DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves
WATER LEVELS : 8ft — START : 10/30/09 — END : 10/30/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0						
1					**0' - 1.8'** - Silty sand (SM) greyish-brown (10YR 5/2) moist, very loose to loose, non-plastic, fine grained sand	
2						
3					**1.8' - 4.5'** - Sandy clay (CL) yellowish-brown (10YR 4/4) dry, very stiff, high plasticity, fine to medium sand	
4						
5						
6					**4.5'- 7.3'** - Clay (CL) mottled yellowish-brown (10YR 5/6) and light olive-grey (5Y 6/2), dry, very stiff to stiff, high plasticity	
7						
W.T. at 8						
9						
10						
11						
12					**7.3' - 18'** - Silty sand (SM) yellowish brown (10YR 5/6) and greenish grey (GLEY1 5/5GY), wet, medium dense to very loose, 35% medium shell hash, very loose sand from **7.3' to 7.5'**	
13						
14						
15						
16						
17						
18						
19					**18' - 20'** - Silty sand (SM) greenish-grey (GLEY1 5/5GY) wet, loose, medium sand, 15% large shell hash.	
20						
					End macrocore sampling at 20' bgs	

CH2MHILL	PROJECT NUMBER 359831.SI.SI	BORING NUMBER CAA03-GW01	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 11.3 ft — START : 10/28/09 — END : 10/28/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0					**0'-0.5'**- Silty sand w/ clay (SM) brownish-grey (10YR 5/2), moist, very loose, very find to fine sand, low plasticity	
1					**0.5'-2'**- Silty sand (SM) yel-brwn (2.5Y 6/3), moist, v loose, f-med sand	
2						
3					**2'-4'**- Sandy clay (CL) brown (10YR 5/2), moist, very loose, very fine to fine sand, low plasticity	
4					4'- 5' - Clayey sand (SC) dlight grey and strong brown, dry, high plasticity, dense, medium grained sand	
5						
6					**5'- 7.5'**- Clayey sand (SC) dark yellowish-brown (10YR 4/6), dry, very stiff, low to medium plasticity, fine to medium grained sand	
7						
8						
9					**7.5'- 10.5**' - Silty sand (SM) dark yellowish-brown (10YR 4/6), moist, loose, non-plastic fines w/ fine to medium grained sand	
10						
11					**10.5'-11.2'** - Silty sand (SM) greenish grey (GLEY 1 5/5GY) moist med-sand, very loose, 15 % shell fragments.	
▽ **W.T. at 11.3**						
12						
13						
14						
15						
16						
17						
18					**11.2'-24'** - Silty sand (SM) light yellowish brown (2.5 Y 6/4) wet, very loose, fine to coarse, whole partial shells present.	
19						
20						
21						
22						
23						
24						
					End macrocore sampling at 24' bgs	

	PROJECT NUMBER	BORING NUMBER	
CH2MHILL	359831.SI.SI	CAA03-GW02	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 6.1 ft — START : 11/3/09 — END : 11/3/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0					**0'-0.5'**- Silty sand (SM) greyish-brown (10YR 5/2), moist, non-plastic fines, loose	
1–2					**0.5'-2.5'**- Silty sand (SM) light olive-brown (2.5Y 5/4), moist, very loose to loose, fine to medium sand	
3					**2.5'-4' -** No recovery	
4					**4' - 4.5' -** Organic soil (OH/OL) reddish black (2.5Y 5/4), dry, brittle	
5, W.T. at 6.1, 7, 8, 9, 10, 11, 12					**4.5'- 12'**- No recovery	
13, 14, 15					**12'-15.7'-** Silty Sand (SM) very dark brown to black, saturated, medium grained, very loose, stained w/ sheen, strong odor	
16					**15.7'-16'-** Silty Sand (SM) greenish-grey (GLEY1 5/5GY), wet, medium grained, loose, non-plastic fines, 10% large shelly hash	
					End macrocore sampling at 16' bgs	

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAA03-GW03	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 3 ft — START : 11/3/09 — END : 11/3/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0					**0'-0.5'-** Silty sand (SM) greyish-brown (10YR 5/2), moist, non-plastic fines, loose	
1					**0.5'-1.8'**- Silty sand (SM) light olive-brown (2.5Y 5/4), moist, medium dense, non- to medium plastic.	
2					**1.8'-2' -** Burnt organics (OH)	
W.T. at 3					**2'-4' -** No recovery	
4					**4'-4.4' -** Same as **1.8'-2'**, except wet	
5					**4.4'- 5.5'**- Silty sand (SM) greenish-grey (GLEY1 6/10GY), wet/saturated, very loose, low plasticity	
6						
7					**5'-8'**- No recovery	
8						
9						
10						
11						
12					**8'- 16'** - Silty sand (SM) greenish-grey/greyish-green mottled (GLEY1 5/5G), wet, very soft	
13						
14						
15						
16						
					End macrocore sampling at 16' bgs	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAA03-GW04	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex

ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff

DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves

WATER LEVELS : 1.85 ft — START : 11/3/09 — END : 11/3/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0					**0'-0.3'-** Silty sand (SM) greyish-brown (10YR 5/2), moist, non-plastic fines, loose, very fine to fine grained	PID reading (0' -1') : 1.2 ppm
1					**0.3'-1.3'**- Silty sand (SM) brownish-yellow (10YR 6/6), medium plasticity, fine grained, medium dense	
W.T. at 1.85					**1.3'-2' -** Black man-made material.	
3					**2'-4' -** No recovery	Moderate hydrocarbon smell.
4					**4'- 5'**- Organic clay (OL) dark brown (10YR 3/3), wet, very soft, black material	
5–8					**5'-8'**- No recovery	
8–11					**8'- 11.8'** - Organic soil (OL) very dark grey (10YR 3/1), wet, very soft	
12					**11.8'-12'** - Silty sand (SM) dark greyish-brown (2.5 Y 4/2) wet, v loose	
13					**12'-13'** - Silty sand (SM) greenish-grey (GLEY1 5/10Y) wet, very loose, medium grain	
14–15					**13'-15'** - Silty sand (SM) very dark-grey to black (2.5Y 3/1 - 2.5/1) wet, very loose, medium grain, 45% wood fragments	
					End macrocore sampling at 15' bgs	

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
359831.SI.SI	CAA03-GW05	SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Sites 4, 9 and AOC 3 SI — LOCATION Cheatham Annex
ELEVATION : — DRILLING CONTRACTOR : Parratt Wolff
DRILLING METHOD AND EQUIPMENT USED : Direct Push using 4' Acetate sleeves
WATER LEVELS : 5.5 ft — START : 11/3/09 — END : 11/3/09 — LOGGER : Toby Stewart

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	CORE DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY SOIL STRUCTURE, AND MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION.
0					**0'-0.4'**- Silty sand (SM) very dark greyish-brown (10YR 3/2), moist, very loose, non-plastic, very fine to fine sand	
1					**0.4'-1.4'**- Silty sand (SM) light olive-brown (2.5Y 5/3), moist, fine, loose, non-plastic fines, trache brownish-black organics	
2					**1.4'-2' -** Clay (CL) mottled yellowish-brown (10YR 5/6) and brownish-yellow (10YR 6/8), moist, high plasticity, stiff	
3					**2'-4' -** No recovery	
4					**4'- 5**' - Man-made wood debris, fibrous drywall with black coating.	Strong hydrocarbon-like odor
5 / W.T. at 5.5 / 6 / 7					**5'-8'**- No recovery	
8 – 16					**8'- 16'** - Silty sand (SM) greenish-grey/greyish-green mottled (GLEY1 5/5G), wet, very soft	
					End macrocore sampling at 16' bgs	

Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

Appendix F
Sample Location Survey Data

CTO-0190 Naval Weapons Station Yorktown Cheatham Annex, Williamsburg, Virginia

Sites 4, 9, and AOC 3

Sample Location Survey Data

01/27/10

SAMPLE LOCATION	NORTHING	EASTING	ELEVATION
Site 4			
CAS04-GW01	3635154.98	12033257.80	21.34
CAS04-GW02	3635236.98	12033285.07	17.87
CAS04-GW03	3635329.67	12033202.39	20.00
CAS04-GW04	3635137.50	12033037.34	23.90
CAS04-SB01	3635109.22	12033227.84	23.32
CAS04-SB02	3635166.85	12033372.88	20.82
CAS04-SB03	3635233.02	12033167.34	21.34
CAS04-SB04	3635280.04	12033180.60	19.73
CAS04-SB05	3635332.65	12033209.91	19.67
CAS04-TP01	3635279.97	12033190.67	18.64
CAS04-TP01	3635274.32	12033187.34	18.87
CAS04-TP02	3635348.42	12033215.46	18.16
CAS04-TP02	3635342.71	12033216.60	18.96
Site 9			
CAS09-GW01	3634329.31	12032033.79	27.14
CAS09-GW02	3634440.18	12032065.33	26.42
CAS09-GW03	3634350.94	12031960.75	26.61
CAS09-GW04	3634231.56	12031991.08	26.86
CAS09-SB01	3634331.99	12032020.85	26.91
CAS09-SB02	3634350.91	12032049.72	26.59
CAS09-SB03	3634301.43	12032035.56	26.99
CAS09-SB04	3634280.74	12032065.26	27.40
CAS09-SB05	3634268.11	12032044.19	27.14
AOC 3			
CAA03-GW01 SB01	3635374.71	12032956.08	25.37
CAA03-GW02 SB02	3635434.63	12033220.23	17.63
CAA03-GW03 SB03	3635497.05	12033319.78	12.90
CAA03-GW04 SB04	3635460.33	12033318.87	11.63
CAA03-GW05 SB05	3635414.46	12033252.18	15.36
CAA03-SB06	3635429.40	12033025.25	25.72
CAA03-SB07	3635532.52	12033185.84	24.89
CAA03-SB08	3635514.89	12033287.67	17.88
CAA03-SB09	3635358.87	12033256.12	17.90
CAA03-SB10	3635362.87	12033180.57	17.34
CAA03-TP01	3635447.03	12033165.29	20.55
CAA03-TP01	3635448.76	12033172.52	20.59
CAA03-TP02	3635416.43	12033234.66	15.13
CAA03-TP02	3635421.26	12033234.96	15.75
CAA03-TP03	3635463.90	12033214.65	18.39
CAA03-TP03	3635467.66	12033209.58	19.00
CAA03-TP04	3635464.67	12033278.67	14.51
CAA03-TP04	3635470.57	12033278.17	14.41

CAA03-TP05	3635501.41	12033249.21	18.59
CAA03-TP05	3635506.57	12033249.89	19.51
CAA03-TP06	3635531.83	12033275.86	21.66
CAA03-TP06	3635527.39	12033279.61	20.74
CAA03-TP07	3635522.66	12033263.91	21.16
CAA03-TP07	3635525.89	12033261.54	22.06
CAA03-TP08	3635451.95	12033316.98	12.00
CAA03-TP08	3635448.36	12033316.78	11.84
CAA03-TP09	3635471.96	12033316.80	11.93
CAA03-TP09	3635465.85	12033318.07	11.70
CAA03-TP10	3635483.08	12033307.33	13.23
CAA03-TP10	3635486.47	12033302.69	13.92
CAA03-TP11	3635495.60	12033315.51	13.41
CAA03-TP11	3635490.27	12033316.31	12.60
CAA03-TP12	3635504.97	12033313.57	14.57
CAA03-TP12	3635497.00	12033314.30	13.89
CAA03-TP13	3635514.30	12033310.88	16.04
CAA03-TP13	3635511.21	12033311.69	15.68
CAA03-TP14	3635496.63	12033332.36	11.25
CAA03-TP14	3635501.16	12033331.92	11.49
CAA03-TP15	3635510.37	12033330.58	14.41
CAA03-TP15	3635514.61	12033330.01	15.84
CAA03-TP16	3635507.72	12033350.27	12.37
CAA03-TP16	3635505.49	12033353.72	11.05
CAA03-TP17	3635515.95	12033352.11	15.52
CAA03-TP17	3635512.98	12033351.74	14.65
CAA03-TP18	3635489.30	12033282.43	15.36
CAA03-TP18	3635489.58	12033289.11	14.75
CAA03-TP19	3635393.29	12033206.58	16.03
CAA03-TP19	3635399.89	12033202.02	16.15
CAA03-TP20	3635389.87	12033139.76	19.15
CAA03-TP20	3635393.82	12033137.94	19.17
CAA03-TP21	3635388.85	12033169.83	17.46
CAA03-TP21	3635385.22	12033170.54	17.67
CAA03-TP22	3635364.18	12033160.98	17.90
CAA03-TP22	3635363.29	12033166.51	17.95
CAA03-TP23	3635370.09	12033191.57	15.99
CAA03-TP23	3635371.48	12033199.12	16.24
CAA03-TP24	3635396.24	12033245.50	15.47
CAA03-TP24	3635404.84	12033247.27	15.08

Appendix G
IDW Analytical Data

CTO-190
Cheatham Annex Site 4, 9 and AOC 3
IDW Unvalidated Data Raw Analytical Results
November 2009

Sample ID	CAA03-IDW-110509
Sample Date	11/5/09
Chemical Name	
TCLP Volatile Organic Compounds (UG/L)	
1,1-Dichloroethene	100 U
1,2-Dichloroethane	100 U
2-Butanone	300 U
Benzene	100 U
Carbon tetrachloride	100 U
Chlorobenzene	100 U
Chloroform	100 U
Tetrachloroethene	100 U
Trichloroethene	100 U
Vinyl chloride	100 U
TCLP Semivolatile Organic Compounds (UG/L)	
1,4-Dichlorobenzene	50 U
2,4,5-Trichlorophenol	120 U
2,4,6-Trichlorophenol	50 U
2,4-Dinitrotoluene	50 U
2-Methylphenol	50 U
3- and 4-Methylphenol	100 U
Hexachlorobenzene	50 U
Hexachlorobutadiene	50 U
Hexachloroethane	50 U
Nitrobenzene	50 U
Pentachlorophenol	120 U
Pyridine	250 U
TCLP Pesticides/Polychlorinated Biphenyls (UG/L)	
CHLORDANE	2.5 U
Endrin	0.5 U
gamma-BHC (Lindane)	0.25 U
Heptachlor	0.25 U
Heptachlor epoxide	0.25 U
Methoxychlor	2.5 U
Toxaphene	5 U
TCLP Herbicides (UG/L)	
2,4,5-TP (Silvex)	15 U
2,4-D	15 U
TCLP Metals (UG/L)	
Arsenic	40 U
Barium	176
Cadmium	50 U
Chromium	8.8 J
Lead	5.5 J
Mercury	0.2 U
Selenium	50 U
Silver	75 U

CTO-190
Cheatham Annex Site 4, 9 and AOC 3
IDW Unvalidated Data Raw Analytical Results
November 2009

Sample ID	CAA03-IDW-110509
Sample Date	11/5/09
Chemical Name	
Wet Chemistry	
Ignitability(DEG/C)	71 >
pH(pH)	7.3
Reactive cyanide(MG/KG)	1 U
Reactive sulfide(MG/KG)	27 U

Notes:

> - NO MATCHING QUALIFIER DEFINITION FOUND IN LOOKUP LIST

J - Analyte present. Value may or may not be accurate or precise
NS - Not sampled
U - The material was analyzed for, but not detected
DEG/C - Degrees centigrade
MG/KG - Milligrams per kilogram
PH - pH units
UG/L - Micrograms per liter

CTO-190
Cheatham Annex Site 4, 9 and AOC 3
IDW Unvalidated Data Detected Analytical Results
November 2009

Sample ID	CAA03-IDW-110509
Sample Date	11/5/09
Chemical Name	
TCLP Volatile Organic Compounds (UG/L)	
No Detections	
TCLP Semivolatile Organic Compounds (UG/L)	
No Detections	
TCLP Pesticides/Polychlorinated Biphenyls (UG/L)	
No Detections	
TCLP Herbicides (UG/L)	
No Detections	
TCLP Metals (UG/L)	
Barium	176
Chromium	8.8 J
Lead	5.5 J
Wet Chemistry	
Ignitability(DEG/C)	71 >
pH(pH)	7.3

Notes:

Shading indicates detection

> - NO MATCHING QUALIFIER DEFINITION FOUND IN LOOKUP LIST

J - Analyte present. Value may or may not be accurate or precise

NS - Not sampled

U - The material was analyzed for, but not detected

DEG/C - Degrees centigrade

MG/KG - Milligrams per kilogram

PH - pH units

UG/L - Micrograms per liter

Appendix H
IDW Disposal Manifest

SOILEX

PROJECT DOCUMENTS

TO: Ms. Lisa King

PROJECT: NAVFAC / CAX Sites 4, 9, and AOC 3
Williamsburg, VA

DATE: January 18, 2010

Please find enclosed all project documentation pertaining to the disposal of waste materials from the above location. This material has been deemed acceptable for disposal and conforms to Soilex Corporation permits and all applicable environmental regulations.

We suggest that you or your customers retain this information indefinitely.

Should you have any questions or require additional copies, please contact our office.

Thank you again for the opportunity to be of service.

Enclosure

P. O. Box 1444, Chesapeake, Virginia 23327 Phone 757.549.8448 Fax 757.549.6668

Certification of Remediation and Recycling

Presented to

NAVFAC MIDLANT

Hereinafter known as the "Generator" of NON-HAZARDOUS PETROLEUM CONTAMINATED MATERIAL, which originated from the CAX Sites 4, 9, and AOC 3, Williamsburg, Virginia.

As evidenced by the receipt of corresponding manifests, **3 drums** of material were delivered to the Chesapeake Facility for biological treatment and disposal at the SPSA Regional Landfill. Said material was received on January 14, 2010 and has been deemed acceptable for treatment according to all applicable Commonwealth of Virginia Department of Environmental Quality regulations.

The remediation and recycling activities are conducted in accordance with Commonwealth of Virginia Department of Environmental Quality Permit-by-Rule No. 510, which applies only to the remediation and recycling of non-hazardous materials.

Certification No. 210-4162
Presented this 18th day of January, 2010

SOILEX CORPORATION

Soilex Corporation
Post Office Box 1444
Chesapeake, VA 23327
(757) 549-8448
FAX: (757) 549-6668

NON-HAZARDOUS SHIPPING MANIFEST

MANIFEST NO.________

GENERATOR

NAME NAVFAC | TELEPHONE

ADDRESS 9742 Maryland Ave. | CITY Norfolk | STATE VA

SHIPMENT ORIGIN NWSY & CAX Sites 4 & 9, & AOC 3 | CITY Williamsburg | STATE VA

AUTHORIZED AGENT c/o CH2M HILL | FIRM

ADDRESS | OTHER Clean 3 CTO-190 Prime Contract # N62470-02-D-3052

MATERIAL CHARACTERIZATION

ACTIVITY GENERATING THIS MATERIAL: UST/AST REMOVAL ________ OTHER CERCLA IDW

PETROLEUM TYPE (S): Various VIRGIN PRODUCT________ NON-VIRGIN PRODUCT________

PHYSICAL STATE: STOCKPILED ________ EXCAVATING________ DRUMS 3 OTHER ________

HANDLING INSTRUCTIONS: **Transport To Facility Designated Below**

FIRE OR SPILL INSTRCUTIONS: **Non-Flammable / Non-Hazardous**

DESTINATION: Chesapeake Facility

I hereby certify, to the best of my knowledge, the material characterized above is non-hazardous as defined by the Virginia Hazardous Waste Management Regulations, Federal Regulations under Subtitle C - RCRA, U.S. Department of Transportation, or local / state of origin regulations.

________ Signature of Generator / Agent

THOMAS L. KAWIECKI / 01/14/2010
Printed Name / Date

TRANSPORTER

TRANSPORTER NAME Soilex Corporation TELEPHONE 549-8448 TRUCK NO. Box

I certify that the materials described above were received by me for shipment and delivered to the designated facility.

________ 1-14-10
Transporter Signature / Date

FACILTIY

I certify that the materials described above were delivered to the facility and received by me.

ACCEPTED BY ________ DATE 1.14.10

REASONS FOR REJECTION ________

Gross Weight	
Tare Weight	
Net Weight	
Tons	

GENERATOR

Appendix I
Laboratory Analytical Results

CTO-190
Cheatham Annex AOC 3
Groundwater Data Raw Analytical Results
November 2009

Station ID	CAA03-GW01	CAA03-GW02	CAA03-GW03	CAA03-GW04	CAA03-GW05
Sample ID	CAA03-GW01-1109	CAA03-GW02-1109	CAA03-GW03-1109	CAA03-GW04-1109	CAA03-GW05-1109
Sample Date	11/02/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name					
Volatile Organic Compounds (UG/L)					
1,1,1-Trichloroethane	1 U	1 U	1 UJ	1 U	1 U
1,1,2,2-Tetrachloroethane	2 U	2 U	2 UJ	2 U	2 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	1 U	1 U	1 UJ	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 UJ	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 UJ	1 U	1 U
1,1-Dichloroethene	2 U	2 U	2 UJ	2 U	2 U
1,2,4-Trichlorobenzene	2 U	2 U	2 UJ	2 U	2 U
1,2-Dibromo-3-chloropropane	2 U	2 U	2 UJ	2 U	2 U
1,2-Dibromoethane	1 U	1 U	1 UJ	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	0.2 J	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 UJ	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 UJ	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 UJ	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	2 J	1 U	1 U
2-Butanone	5 U	5 U	5 UJ	5 U	5 U
2-Hexanone	6 U	6 U	6 UJ	6 U	6 U
4-Methyl-2-pentanone	5 U	5 U	5 UJ	5 U	5 U
Acetone	3 B	4 B	3 B	7 U	3 B
Benzene	1 U	1 U	1 UJ	1 U	14
Bromodichloromethane	1 U	1 U	1 UJ	1 U	1 U
Bromoform	1 U	1 U	1 UJ	1 U	1 U
Bromomethane	2 U	2 U	2 UJ	2 U	2 U
Carbon disulfide	0.7 B	1 U	1 UJ	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 UJ	1 U	1 U
Chlorobenzene	1 U	1 U	1 UJ	1 U	1 U
Chloroethane	2 U	2 U	2 UJ	2 U	2 U
Chloroform	1 U	1 U	1 UJ	1 U	1 U
Chloromethane	2 U	2 U	2 UJ	2 U	2 U
cis-1,2-Dichloroethene	1 U	1 U	1 UJ	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 UJ	1 U	1 U
Cyclohexane	1 U	1 U	1 UJ	1 U	12
Dibromochloromethane	1 U	1 U	1 UJ	1 U	1 U
Dichlorodifluoromethane (Freon-12)	2 U	2 U	2 UJ	2 U	2 U
Ethylbenzene	1 U	1 U	1 UJ	0.2 J	10
Isopropylbenzene	1 U	1 U	1 UJ	1 U	4
m- and p-Xylene	2 U	2 U	2 UJ	1 J	20
Methyl acetate	2 U	2 U	2 UJ	2 U	2 U
Methylcyclohexane	1 U	1 U	1 UJ	1 U	11
Methylene chloride	5 U	5 U	5 UJ	5 U	5 U
Methyl-tert-butyl ether (MTBE)	3	2 U	2 UJ	2 U	2 U
o-Xylene	1 U	1 U	1 UJ	0.4 J	5
Styrene	1 U	1 U	1 UJ	1 U	0.5 J
Tetrachloroethene	3 U	3 U	3 UJ	3 U	3 U
Toluene	1 U	1 U	1 UJ	1 U	2
trans-1,2-Dichloroethene	1 U	1 U	1 UJ	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 UJ	1 U	1 U
Trichloroethene	1 U	1 U	1 UJ	1 U	1 U
Trichlorofluoromethane(Freon-11)	2 U	2 U	2 UJ	2 U	2 U
Vinyl chloride	2 U	2 U	2 UJ	2 U	2 U
Xylene, total	3 U	3 U	3 UJ	2 J	25
Semivolatile Organic Compounds (UG/L)					
1,1-Biphenyl	10 U	9 U	12 U	9 U	8 J
1,2,4,5-Tetrachlorobenzene	10 U	9 U	12 U	9 U	12 U
2,2'-Oxybis(1-chloropropane)	10 U	9 U	12 U	9 U	12 U
2,4,5-Trichlorophenol	25 U	24 U	30 U	24 U	29 U
2,4,6-Trichlorophenol	10 U	9 U	12 U	9 U	12 U
2,4-Dichlorophenol	10 U	9 U	12 U	9 U	12 U
2,4-Dimethylphenol	14 U	13 U	17 U	13 U	29
2,4-Dinitrophenol	25 U	24 U	30 U	24 U	29 U
2,4-Dinitrotoluene	10 U	9 U	12 U	9 U	12 U
2,6-Dinitrotoluene	10 U	9 U	12 U	9 U	12 U
2-Chloronaphthalene	0.2 U	0.24 U	0.3 U	0.71 U	0.29 U
2-Chlorophenol	10 U	9 U	12 U	9 U	12 U
2-Methylnaphthalene	0.2 U	1.5	0.3 U	3.3	32
2-Methylphenol	12 U	11 U	14 U	11 U	14 U
2-Nitroaniline	25 U	24 U	30 U	24 U	29 U
2-Nitrophenol	10 U	9 U	12 U	9 U	12 U
3- and 4-Methylphenol	17 U	16 U	20 U	16 U	12 J
3,3'-Dichlorobenzidine	10 U	9 U	12 U	9 U	12 U
3-Nitroaniline	25 U	24 U	30 U	24 U	29 U
4,6-Dinitro-2-methylphenol	25 U	24 U	30 U	24 U	29 U
4-Bromophenyl-phenylether	10 U	9 U	12 U	9 U	12 U
4-Chloro-3-methylphenol	11 U	10 U	13 U	10 U	13 U
4-Chloroaniline	10 U	9 U	12 U	9 U	12 U
4-Chlorophenyl-phenylether	10 U	9 U	12 U	9 U	12 U
4-Nitroaniline	25 U	24 U	30 U	24 U	29 U

CTO-190
Cheatham Annex AOC 3
Groundwater Data Raw Analytical Results
November 2009

Station ID	CAA03-GW01	CAA03-GW02	CAA03-GW03	CAA03-GW04	CAA03-GW05
Sample ID	CAA03-GW01-1109	CAA03-GW02-1109	CAA03-GW03-1109	CAA03-GW04-1109	CAA03-GW05-1109
Sample Date	11/02/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name					
4-Nitrophenol	25 U	24 U	30 U	24 U	29 U
Acenaphthene	0.2 U	0.54	0.24 U	1.4	8.9 J
Acenaphthylene	0.2 U	0.3	0.24 U	0.26 J	4.8
Acetophenone	12 U	11 U	14 U	11 U	14 U
Anthracene	0.2 U	0.26	0.24 U	1	6.7
Atrazine	10 UJ	9 U	12 U	9 U	12 U
Benzaldehyde	10 UJ	9 UJ	12 UJ	9 U	2 J
Benzo(a)anthracene	0.2 U	0.29	0.24 U	1.3	2.9
Benzo(a)pyrene	0.2 U	0.17 J	0.1 J	1.7	2
Benzo(b)fluoranthene	0.2 U	0.15 J	0.36 U	2.2	2.7
Benzo(g,h,i)perylene	0.2 U	0.083 J	0.24 U	0.49 J	1.2
Benzo(k)fluoranthene	0.2 U	0.19 U	0.24 U	0.92	0.94
bis(2-Chloroethoxy)methane	10 U	9 U	12 U	9 U	12 U
bis(2-Chloroethyl)ether	10 U	9 U	12 U	9 U	12 U
bis(2-Ethylhexyl)phthalate	1 U	1.9 U	2.4 U	5.7 U	2.3 U
Butylbenzylphthalate	10 U	9 U	12 U	9 U	12 U
Caprolactam	10 UL	9 U	12 U	9 U	12 U
Carbazole	0.2 U	4.3	0.71 U	8.6 J	0.7 U
Chrysene	0.2 U	0.19 U	0.24 U	0.58 B	2.1
Dibenz(a,h)anthracene	0.2 U	0.24 U	0.3 U	0.21 J	0.26 J
Dibenzofuran	10 U	9 U	12 U	3 J	19
Diethylphthalate	10 U	9 U	12 U	9 U	12 U
Dimethyl phthalate	10 U	9 U	12 U	9 U	12 U
Di-n-butylphthalate	1 U	2.4 U	3 U	7.1 U	2.9 U
Di-n-octylphthalate	10 U	9 U	12 U	9 U	12 U
Fluoranthene	0.2 U	0.52	0.3 U	1.8	8.6 J
Fluorene	0.2 U	0.98	0.24 U	3.2	21 J
Hexachlorobenzene	0.2 U	0.19 U	0.24 U	0.57 U	0.23 U
Hexachlorobutadiene	10 U	9 U	12 U	9 U	12 U
Hexachlorocyclopentadiene	10 U	9 U	12 U	9 U	12 U
Hexachloroethane	0.2 U	0.24 U	0.3 U	0.71 U	0.29 U
Indeno(1,2,3-cd)pyrene	0.2 U	0.24 B	0.29 B	0.89 B	1.2 J
Isophorone	10 U	9 U	12 U	9 U	12 U
Naphthalene	0.2 U	11	0.24 U	13	560
n-Nitroso-di-n-propylamine	10 U	9 U	12 U	9 U	12 U
n-Nitrosodiphenylamine	12 U	11 U	14 U	11 U	14 U
Nitrobenzene	10 U	9 U	12 U	9 U	12 U
Pentachlorophenol	1 UL	0.94 U	1.2 U	2.8 U	1.2 U
Phenanthrene	0.2 U	1.6	0.24 U	3.1	36
Phenol	10 U	9 U	12 U	9 U	5 J
Pyrene	0.2 U	0.42	0.24 U	1.5	6.3
Pesticide/Polychlorinated Biphenyls (UG/L)					
4,4'-DDD	0.1 U	0.11 UJ	0.11 U	0.098 U	0.12 U
4,4'-DDE	0.1 U	0.11 UJ	0.11 U	0.013 J	0.12 U
4,4'-DDT	0.1 U	0.11 UJ	0.11 U	0.098 U	0.12 U
Aldrin	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
alpha-BHC	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
alpha-Chlordane	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
Aroclor-1016	0.5 U	0.56 U	0.54 U	0.49 U	0.6 U
Aroclor-1221	0.7 U	0.79 U	0.76 U	0.69 U	0.83 U
Aroclor-1232	0.5 U	0.56 U	0.54 U	0.49 U	0.6 U
Aroclor-1242	0.6 U	0.67 U	0.65 U	0.59 U	0.71 U
Aroclor-1248	0.7 U	0.79 U	0.76 U	0.69 U	0.83 U
Aroclor-1254	0.5 U	0.56 U	0.54 U	0.49 U	0.6 U
Aroclor-1260	0.6 U	0.67 U	0.65 U	0.59 U	0.71 U
beta-BHC	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
delta-BHC	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
Dieldrin	0.1 U	0.11 UJ	0.11 U	0.017 J	0.12 U
Endosulfan I	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
Endosulfan II	0.1 U	0.11 UJ	0.11 U	0.098 U	0.12 U
Endosulfan sulfate	0.1 U	0.11 UJ	0.11 U	0.098 U	0.12 U
Endrin	0.1 U	0.11 UJ	0.11 U	0.098 U	0.12 U
Endrin aldehyde	0.1 U	0.11 UJ	0.11 U	0.098 U	0.12 U
Endrin ketone	0.1 U	0.11 UJ	0.11 U	0.098 U	0.12 U
gamma-BHC (Lindane)	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
gamma-Chlordane	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
Heptachlor	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
Heptachlor epoxide	0.05 U	0.056 UJ	0.054 U	0.049 U	0.06 U
Methoxychlor	0.5 U	0.56 UJ	0.54 U	0.49 U	0.6 U
Toxaphene	1 U	1.1 UJ	1.1 U	0.98 U	1.2 U
Total Metals (UG/L)					
Aluminum	2,240	13,300	23,300	357	1,450
Antimony	0.54 J	0.67 J	0.58 J	0.35 J	0.54 J
Arsenic	5.5	8	53.8	16.8	4.8 J
Barium	26	114	107	139	302
Beryllium	0.17 J	0.71 J	1.4	1 U	0.11 J
Cadmium	0.31 J	0.26 J	0.23 J	1 U	0.09 J

CTO-190
Cheatham Annex AOC 3
Groundwater Data Raw Analytical Results
November 2009

Station ID	CAA03-GW01	CAA03-GW02	CAA03-GW03	CAA03-GW04	CAA03-GW05
Sample ID	CAA03-GW01-1109	CAA03-GW02-1109	CAA03-GW03-1109	CAA03-GW04-1109	CAA03-GW05-1109
Sample Date	11/02/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name					
Calcium	149,000	97,300	86,600	140,000	114,000
Chromium	10.5 J	23.9	44.5	2.8 J	5 J
Cobalt	2.2 J	4.1 J	5.1 J	30 U	0.91 J
Copper	13.8 J	10.7 J	10.7 J	25 U	2 J
Cyanide	12 U	12 U	12 U	12 U	12 U
Iron	4,660	28,800	31,900	19,900	39,400
Lead	2.5 J	18.6	15.1	1.6 J	5 J
Magnesium	3,570	19,600	5,270	6,580	10,200
Manganese	50.7	642	290	210	380
Mercury	0.2 U	0.73	0.03 J	0.2 U	2.3
Nickel	8 J	11.1 J	12.8 J	1.9 J	3.8 J
Potassium	2,010	17,100	4,640	2,290	6,990
Selenium	10 U	10 U	10 U	10 U	10 U
Silver	15 U	0.85 J	0.84 J	15 U	2.2 J
Sodium	14,400	35,800	7,070	9,790	19,800
Thallium	0.2 B	0.81 B	1.1 B	0.45 B	0.36 B
Vanadium	11.8 J	24.8 J	55.2	25 U	25 U
Zinc	13.2 J	55.7	39.1	10.5 J	50.4
Dissolved Metals (UG/L)					
Aluminum, Dissolved	76.9 B	14.6 B	300 U	300 U	300 U
Antimony, Dissolved	0.15 J	0.17 J	0.16 J	0.23 J	0.19 J
Arsenic, Dissolved	5 U	3.4 J	45.4	11.9	2.5 J
Barium, Dissolved	19.5	56.5	32.4	112	258
Beryllium, Dissolved	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	0.06 J	1 U	0.07 J	1 U	0.07 J
Calcium, Dissolved	139,000	92,800	89,500	135,000	111,000
Chromium, Dissolved	0.99 J	0.5 J	0.53 J	1.3 J	0.65 J
Cobalt, Dissolved	1.1 J	30 U	30 U	30 U	0.45 J
Copper, Dissolved	25 U	25 U	25 U	25 U	25 U
Iron, Dissolved	95.5 J	15,400	6,780	14,500	28,600
Lead, Dissolved	5 U	5 U	1.5 J	5 U	5 U
Magnesium, Dissolved	3,020	16,500	2,860	5,420	9,500
Manganese, Dissolved	36.8	520	258	163	377
Mercury, Dissolved	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	4.6 J	0.69 B	1.2 B	1.2 B	1.8 J
Potassium, Dissolved	1,360	15,000	1,800	1,970	6,550
Selenium, Dissolved	10 U	10 U	10 U	10 U	10 U
Silver, Dissolved	15 U	0.84 J	15 U	15 U	0.97 J
Sodium, Dissolved	14,300	35,500	7,340	9,150	19,500
Thallium, Dissolved	0.11 B	0.44 B	0.62 B	0.91 B	0.23 B
Vanadium, Dissolved	25 U	25 U	25 U	25 U	25 U
Zinc, Dissolved	25 U	25 U	2.8 B	25 U	2.5 B

Notes:

Shading indicates detections

B - Analyte not detected above the level reported in associated blanks

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UL - Analyte not detected, quantitation limit is probably higher

UG/L - Micrograms per liter

CTO-190
Cheatham Annex AOC 3
Subsurface Soil Data Raw Analytical Results
November 2009

Station ID	CAA03-SB01	CAA03-SB02		CAA03-SB03		CAA03-SB04		CAA03-SB05		CAA03-SB06	CAA03-SB07	CAA03-SB08		CAA03-SB09	CAA03-SB10
Sample ID	CAA03-SB01-1109	CAA03-SB02-1109A	CAA03-SB02-1109B	CAA03-SB03-1109A	CAA03-SB03-1109B	CAA03-SB04-1109A	CAA03-SB04-1109B	CAA03-SB05-1109A	CAA03-SB05-1109B	CAA03-SB06-1109	CAA03-SB07-1109	CAA03-SB08-1109	CAA03-SB08P-1109	CAA03-SB09-1109	CAA03-SB10-1109
Sample Date	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name															
Volatile Organic Compounds (UG/KG)															
1,1,1-Trichloroethane	6 UJ	6 UJ	12 UJ	7 UJ	8 UJ	7 UJ	12 UJ	6 UJ	9 UJ	6 UJ	6 UJ	7 UJ	7 UJ	7 UJ	6 UJ
1,1,2,2-Tetrachloroethane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	6 UJ	6 UJ	12 UJ	7 UJ	8 UJ	7 UJ	12 UJ	6 UJ	9 UJ	6 UJ	6 UJ	7 UJ	7 UJ	7 UJ	6 UJ
1,1,2-Trichloroethane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,1-Dichloroethane	6 UJ	6 UJ	12 UJ	7 UJ	8 UJ	7 UJ	12 UJ	6 UJ	9 UJ	6 UJ	6 UJ	7 UJ	7 UJ	7 UJ	6 UJ
1,1-Dichloroethene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,2,4-Trichlorobenzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,2-Dibromo-3-chloropropane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,2-Dibromoethane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,2-Dichlorobenzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,2-Dichloroethane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,2-Dichloropropane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,3-Dichlorobenzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
1,4-Dichlorobenzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
2-Butanone	24 UJ	25 UJ	31 J	30 UJ	34 UJ	28 UJ	40 J	23 UJ	34 J	25 UJ	25 UJ	30 UJ	30 UJ	29 UJ	27 UJ
2-Hexanone	24 UJ	25 UJ	50 UJ	30 UJ	34 UJ	28 UJ	48 UJ	23 UJ	37 UJ	25 UJ	25 UJ	30 UJ	30 UJ	29 UJ	27 UJ
4-Methyl-2-pentanone	24 UJ	25 UJ	50 UJ	30 UJ	34 UJ	28 UJ	48 UJ	23 UJ	37 UJ	25 UJ	25 UJ	30 UJ	30 UJ	29 UJ	27 UJ
Acetone	69 B	29 B	290 J	68 B	73 B	60 B	310 J	65 B	210 J	45 B	52 B	220 J	240 J	74 B	100 B
Benzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	2 J	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Bromodichloromethane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Bromoform	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Bromomethane	9 UJ	10 UJ	20 UJ	12 UJ	14 UJ	11 UJ	19 UJ	9 UJ	15 UJ	10 UJ	10 UJ	12 UJ	12 UJ	12 UJ	11 UJ
Carbon disulfide	5 UJ	5 UJ	4 J	6 UJ	7 UJ	6 UJ	3 J	5 UJ	1 J	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Carbon tetrachloride	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Chlorobenzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Chloroethane	9 UJ	10 UJ	20 UJ	12 UJ	14 UJ	11 UJ	19 UJ	9 UJ	15 UJ	10 UJ	10 UJ	12 UJ	12 UJ	12 UJ	11 UJ
Chloroform	6 UJ	6 UJ	12 UJ	7 UJ	8 UJ	7 UJ	12 UJ	1 J	9 UJ	6 UJ	6 UJ	0.8 J	7 UJ	7 UJ	6 UJ
Chloromethane	9 UJ	10 UJ	20 UJ	12 UJ	14 UJ	11 UJ	19 UJ	9 UJ	15 UJ	10 UJ	10 UJ	12 UJ	12 UJ	12 UJ	11 UJ
cis-1,2-Dichloroethene	6 UJ	6 UJ	12 UJ	7 UJ	8 UJ	7 UJ	12 UJ	6 UJ	9 UJ	6 UJ	6 UJ	7 UJ	7 UJ	7 UJ	6 UJ
cis-1,3-Dichloropropene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Cyclohexane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Dibromochloromethane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Dichlorodifluoromethane (Freon-12)	9 UJ	10 UJ	20 UJ	12 UJ	14 UJ	11 UJ	19 UJ	9 UJ	15 UJ	10 UJ	10 UJ	12 UJ	12 UJ	12 UJ	11 UJ
Ethylbenzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	2 J	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Isopropylbenzene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	9 J	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
m- and p-Xylene	10 UJ	11 UJ	22 UJ	13 UJ	15 UJ	12 UJ	3 J	10 UJ	19 J	11 UJ	11 UJ	13 UJ	13 UJ	13 UJ	12 UJ
Methyl acetate	8 UJ	9 UJ	18 UJ	11 UJ	12 UJ	10 UJ	17 UJ	8 UJ	13 UJ	9 UJ	9 UJ	11 UJ	11 UJ	10 UJ	10 UJ
Methylcyclohexane	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	2 J	5 UJ	6 J	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Methylene chloride	13 J	25 UJ	19 J	16 J	17 J	28 UJ	48 UJ	23 UJ	37 UJ	25 UJ	25 UJ	30 UJ	30 UJ	29 UJ	12 J
Methyl-tert-butyl ether (MTBE)	8 UJ	9 UJ	18 UJ	11 UJ	12 UJ	10 UJ	17 UJ	8 UJ	13 UJ	9 UJ	9 UJ	11 UJ	11 UJ	10 UJ	10 UJ
o-Xylene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	5 J	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Styrene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	2 J	6 UJ	6 UJ	5 UJ
Tetrachloroethene	5 UJ	5 UJ	10 UJ	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	7 UJ	5 UJ	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ
Toluene	5 UJ	5 UJ	3 J	6 UJ	7 UJ	6 UJ	10 UJ	5 UJ	4 J	2 J	5 UJ	6 UJ	5 J	6 UJ	5 UJ
trans-1,2-Dichloroethene	6 UJ	7 UJ	14 UJ	8 UJ	9 UJ	8 UJ	13 UJ	6 UJ	10 UJ	7 UJ	7 UJ	8 UJ	8 UJ	8 UJ	8 UJ
trans-1,3-Dichloropropene	6 UJ	7 UJ	14 UJ	8 UJ	9 UJ	8 UJ	13 UJ	6 UJ	10 UJ	7 UJ	7 UJ	8 UJ	8 UJ	8 UJ	8 UJ
Trichloroethene	6 UJ	6 UJ	12 UJ	7 UJ	8 UJ	7 UJ	12 UJ	6 UJ	9 UJ	6 UJ	6 UJ	7 UJ	7 UJ	7 UJ	6 UJ
Trichlorofluoromethane(Freon-11)	9 UJ	10 UJ	20 UJ	12 UJ	14 UJ	11 UJ	19 UJ	9 UJ	15 UJ	10 UJ	10 UJ	12 UJ	12 UJ	12 UJ	11 UJ
Vinyl chloride	9 UJ	10 UJ	20 UJ	12 UJ	14 UJ	11 UJ	19 UJ	9 UJ	15 UJ	10 UJ	10 UJ	12 UJ	12 UJ	12 UJ	11 UJ
Xylene, total	14 UJ	15 UJ	30 UJ	18 UJ	20 UJ	16 UJ	3 J	14 UJ	24 J	15 UJ	15 UJ	18 UJ	18 UJ	17 UJ	16 UJ
Semivolatile Organic Compounds (UG/KG)															
1,1-Biphenyl	350 U	370 U	540 U	360 U	380 U	360 U	690	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
1,2,4,5-Tetrachlorobenzene	450 U	470 U	690 U	460 U	480 U	450 U	640 U	450 U	590 U	470 U	460 U	490 U	460 U	460 U	370 U
2,2'-Oxybis(1-chloropropane)	350 U	370 UJ	540 UJ	360 U	380 U	360 UJ	500 U	360 UJ	460 U	370 U	360 U	380 U	360 U	360 U	290 U
2,4,5-Trichlorophenol	880 U	920 U	1,300 U	900 U	940 U	880 U	1,200 U	880 U	1,200 U	920 U	900 U	950 U	890 U	900 U	730 U
2,4,6-Trichlorophenol	510 U	540 U	790 U	530 U	550 U	520 U	740 U	520 U	670 U	540 U	520 U	560 U	520 U	530 U	430 U
2,4-Dichlorophenol	480 U	500 U	740 U	490 U	510 U	480 U	690 U	480 U	630 U	500 U	490 U	520 U	490 U	500 U	400 U
2,4-Dimethylphenol	540 U	560 U	820 U	550 U	570 U	540 U	770 U	540 U	700 U	560 U	540 U	580 U	540 U	550 U	440 U
2,4-Dinitrophenol	1,200 U	1,300 U	1,900 U	1,200 U	1,300 U	1,200 U	1,700 U	1,200 U	1,600 U	1,300 U	1,200 U	1,300 U	1,200 U	1,200 U	1,000 U
2,4-Dinitrotoluene	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
2,6-Dinitrotoluene	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
2-Chloronaphthalene	21 U	22 U	33 U	22 U	23 U	22 U	31 U	22 U	28 U	22 U	22 U	23 U	22 U	22 U	18 U
2-Chlorophenol	540 U	560 U	820 U	550 U	570 U	540 U	770 U	540 U	700 U	560 U	540 U	580 U	540 U	550 U	440 U
2-Methylnaphthalene	120 J	3.6 J	210	22 U	23 U	22 U	1,600	22 U	640	9.5 J	32 J	23 U	22 U	22 U	18 U
2-Methylphenol	640 U	670 U	980 U	660 U	680 U	650 U	920 U	650 U	840 U	670 U	660 U	700 U	650 U	660 U	530 U
2-Nitroaniline	880 U	920 U	1,300 U	900 U	940 U	880 U	1,200 U	880 U	1,200 U	920 U	900 U	950 U	890 U	900 U	730 U
2-Nitrophenol	540 U	570 U	840 U	560 U	580 U	550 U	780 U	550 U	720 U	570 U	560 U	590 U	550 U	560 U	450 U
3- and 4-Methylphenol	610 U	640 U	940 U	630 U	650 U	620 U	870 U	610 U	800 U	640 U	620 U	660 U	620 U	630 U	510 U
3,3'-Dichlorobenzidine	370 U	390 U	580 U	380 U	400 U	380 U	540 U	380 U	490 U	390 U	380 U	410 U	380 U	380 U	310 U
3-Nitroaniline	880 U	920 U	1,300 U	900 U	940 U	880 U	1,200 U	880 U	1,200 U	920 U	900 U	950 U	890 U	900 U	730 U
4,6-Dinitro-2-methylphenol	1,200 U	1,200 U	1,800 U	1,200 U	1,200 U	1,200 U	1,700 U	1,200 U	1,500 U	1,200 U	1,200 U	1,300 U	1,200 U	1,200 U	980 U
4-Bromophenyl-phenylether	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
4-Chloro-3-methylphenol	540 U	560 U	820 U	550 U	570 U	540 U	770 U	540 U	700 U	560 U	540 U	580 U	540 U	550 U	440 U
4-Chloroaniline	380 U	400 U	590 U	400 U	410 U	390 U	550 U	390 U	500 U	400 U	390 U	420 U	390 U	400 U	320 U
4-Chlorophenyl-phenylether	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
4-Nitroaniline	880 U	920 U	1,300 U	900 U	940 U	880 U	1,200 U	880 U	1,200 U	920 U	900 U	950 U	890 U	900 U	730 U

Station ID	CAA03-SB01	CAA03-SB02		CAA03-SB03		CAA03-SB04		CAA03-SB05		CAA03-SB06	CAA03-SB07	CAA03-SB08		CAA03-SB09	CAA03-SB10
Sample ID	CAA03-SB01-1109	CAA03-SB02-1109A	CAA03-SB02-1109B	CAA03-SB03-1109A	CAA03-SB03-1109B	CAA03-SB04-1109A	CAA03-SB04-1109B	CAA03-SB05-1109A	CAA03-SB05-1109B	CAA03-SB06-1109	CAA03-SB07-1109	CAA03-SB08-1109	CAA03-SB08P-1109	CAA03-SB09-1109	CAA03-SB10-1109
Sample Date	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name															
4-Nitrophenol	1,000 U	1,000 U	1,500 U	1,000 U	1,100 U	1,000 U	1,400 U	1,000 U	1,300 U	1,000 U	1,000 U	1,100 U	1,000 U	1,000 U	830 U
Acenaphthene	290 J	8.5 J	58	22 U	12 J	5.9 J	660	22 U	140	38	160	23 U	22 U	22 U	18 U
Acenaphthylene	21 U	100	140	22 U	8.8 J	23	390 J	22 U	66	18 J	50 J	23 U	22 U	22 U	18 U
Acetophenone	580 U	600 U	890 U	590 U	620 U	580 U	830 U	580 U	760 U	610 U	590 U	630 U	580 U	590 U	480 U
Anthracene	1,200	66	280	22 U	17 J	35	2,400	22 U	1,500	120	560	23 U	22 U	22 U	18 U
Atrazine	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Benzaldehyde	380 UJ	400 U	590 U	400 U	410 U	390 U	550 U	390 U	500 U	400 U	390 U	420 U	390 U	400 U	320 U
Benzo(a)anthracene	1,900	350	840	11 J	34	180	2,700	8 J	320	440	1,800	23 U	11 J	22 U	18 U
Benzo(a)pyrene	1,100	330	690	5.3 J	26	260	1,700	22 U	210	250	1,400	23 U	12 J	22 U	18 U
Benzo(b)fluoranthene	1,700	470	900	22 U	44 J	360	2,200	8.9 J	250 J	480	2,300	23 U	19 J	22 U	18 U
Benzo(g,h,i)perylene	220 L	130 L	140 L	22 UL	23 UL	66 L	490 L	22 UL	27 L	48 L	560 J	23 R	3 B	22 R	18 R
Benzo(k)fluoranthene	710	150	220	22 U	9.8 J	84	910	22 U	77	160	600	23 U	22 U	22 U	18 U
bis(2-Chloroethoxy)methane	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
bis(2-Chloroethyl)ether	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
bis(2-Ethylhexyl)phthalate	110 U	110 U	660 J	110 U	110 U	110 U	290	110 U	320	41 J	160	120 U	110 U	110 U	89 U
Butylbenzylphthalate	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Caprolactam	470 U	490 R	720 R	480 R	500 R	470 R	670 R	470 R	620 R	490 R	480 R	510 R	480 R	480 R	390 R
Carbazole	650 J	39	940	22 U	18 J	17 J	2,400	22 U	1,900	180 J	210 J	23 U	22 U	22 U	18 U
Chrysene	1,800	320	840	22 U	19 J	160 J	2,000	22 U	320 J	420	1,800	23 U	18 J	22 U	18 U
Dibenz(a,h)anthracene	180 J	85 K	120 K	22 U	23 U	70 K	330 K	22 U	36 K	52 K	250	23 U	4.2 J	22 U	18 U
Dibenzofuran	350 J	370 U	280 J	360 U	380 U	360 U	2,000	360 U	350 J	370 U	120 J	380 U	360 U	360 U	290 U
Diethylphthalate	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Dimethyl phthalate	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Di-n-butylphthalate	110 U	110 U	160 U	110 U	110 U	110 U	150 U	110 U	140 U	110 U	110 U	120 U	110 U	110 U	89 U
Di-n-octylphthalate	680 U	710 U	1,000 U	700 U	730 U	690 U	980 U	690 U	900 U	720 U	700 U	740 U	690 U	700 U	570 U
Fluoranthene	5,400	620	2,400	8.4 B	72	320	6,000	7.4 B	820	1,000	4,400	4.5 J	22 U	22 U	18 U
Fluorene	660	33	390	22 U	29	12 J	2,000	22 U	450	58	220	23 U	22 U	22 U	18 U
Hexachlorobenzene	21 U	22 U	33 U	22 U	23 U	22 U	31 U	22 U	28 U	22 U	22 U	23 U	7.2 J	22 U	18 U
Hexachlorobutadiene	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Hexachlorocyclopentadiene	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Hexachloroethane	21 U	22 U	33 U	22 U	23 U	22 U	31 U	22 U	28 U	22 U	22 U	23 U	22 U	22 U	18 U
Indeno(1,2,3-cd)pyrene	1,400 K	230 J	430 J	14 J	52 J	280 J	240 J	22 U	200 J	150 J	1,300 J	5.6 B	21 B	22 U	18 U
Isophorone	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Naphthalene	240	7.4 J	630	22 U	14 J	22 U	8,000	22 U	3,500 J	28	29	23 U	22 U	22 U	18 U
n-Nitroso-di-n-propylamine	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
n-Nitrosodiphenylamine	710 U	740 U	1,100 U	720 U	750 U	710 U	1,000 U	710 U	930 U	740 U	720 U	770 U	720 U	730 U	590 U
Nitrobenzene	350 U	370 U	540 U	360 U	380 U	360 U	500 U	360 U	460 U	370 U	360 U	380 U	360 U	360 U	290 U
Pentachlorophenol	110 U	110 UL	160 UL	110 UL	110 UL	110 UL	150 UL	110 UL	140 UL	110 UL	110 UL	120 UJ	110 UJ	110 UJ	89 UJ
Phenanthrene	5,000	260	2,600	2.5 B	48	130	8,000	3.4 B	1,400	800	2,900	23 U	22 U	22 U	18 U
Phenol	500 U	520 U	770 U	520 U	540 U	510 U	720 U	510 U	660 U	530 U	510 U	550 U	510 U	520 U	420 U
Pyrene	4,000	480	1,700	4.4 J	41	260	4,100	4.1 J	640	810	3,900	23 U	22 U	22 U	18 U
Pesticide/Polychlorinated Biphenyls (UG/KG)															
4,4'-DDD	2.8 J	9.2	3.3 J	5.1 J	1.2 J	13	170 J	2.6 J	4.8 UJ	2.4 J	20 J	3.8 UJ	1.1 J	3.6 UJ	3.5 U
4,4'-DDE	1.6 B	24	1.6 J	7.4 J	1.6 J	20	150 J	6	1.5 J	1.2 J	19	3.8 UJ	3.8 U	3.6 UJ	3.5 U
4,4'-DDT	3.6 UJ	23	5.3 UJ	3.5 UJ	11 J	3.8	5.1 UJ	1.8 J	4.8 UJ	3.5 UJ	32	12 J	3.8 U	3.6 UJ	3.5 U
Aldrin	1.9 UJ	1.8 U	1.2 J	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	2.4 UJ	1.8 UJ	1.9 U	1.1 J	2 U	1.9 UJ	1.8 U
alpha-BHC	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	2.4 UJ	1.8 UJ	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
alpha-Chlordane	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	4 J	1.8 U	2.4 UJ	1.8 UJ	0.89 J	2 UJ	2 U	1.9 UJ	1.8 U
Aroclor-1016	20 U	19 U	29 U	19 U	21 U	20 U	28 U	19 U	26 U	19 U	20 U	21 UJ	21 U	20 UL	19 U
Aroclor-1221	46 U	45 U	67 U	44 U	49 U	46 U	65 U	43 U	60 U	44 U	46 U	48 UJ	48 U	46 UL	44 U
Aroclor-1232	31 U	30 U	45 U	29 U	33 U	30 U	44 U	29 U	40 U	29 U	31 U	32 UJ	32 U	31 UL	29 U
Aroclor-1242	20 U	19 U	29 U	19 U	21 U	20 U	28 U	19 U	26 U	19 U	20 U	21 UJ	21 U	20 UL	19 U
Aroclor-1248	21 U	20 U	30 U	20 U	22 U	21 U	30 U	20 U	27 U	20 U	21 U	22 UJ	22 U	21 UL	20 U
Aroclor-1254	19 U	18 U	27 U	18 U	20 U	18 U	26 U	18 U	24 U	18 U	19 U	20 UJ	20 U	19 UL	18 U
Aroclor-1260	20 U	19 U	29 U	19 U	21 U	20 U	28 U	19 U	26 U	19 U	20 U	21 UJ	21 U	20 UL	19 U
beta-BHC	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	2.4 UJ	1.8 UJ	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
delta-BHC	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	1.3 J	1.4 J	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
Dieldrin	3.6 UJ	1.9 J	5.3 UJ	2 J	3.9 UJ	3.2 J	30 J	1 J	4.8 UJ	3.5 UJ	3.6 U	1.3 J	3.8 U	0.65 J	3.5 U
Endosulfan I	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	2.4 UJ	1.8 UJ	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
Endosulfan II	3.6 UJ	3.6 U	5.3 UJ	3.5 UJ	3.9 UJ	3.6 U	5.1 UJ	3.4 U	4.8 UJ	3.5 UJ	3.6 U	3.8 UJ	3.8 U	3.6 UJ	3.5 U
Endosulfan sulfate	3.6 UJ	3.6 U	2.7 J	3.5 UJ	3.9 UJ	3.6 U	5.1 UJ	3.4 U	4.8 UJ	3.5 UJ	9.2 J	3.8 UJ	3.8 U	3.6 UJ	3.5 U
Endrin	3.6 UJ	3.6 U	5.3 UJ	13 J	76 J	3.6 U	5.1 UJ	3.4 U	4.8 UJ	3.5 UJ	3.6 U	96 J	5.5 J	8.6 J	3.5 U
Endrin aldehyde	3.6 UJ	3.6 U	5.3 UJ	3.5 UJ	3.9 UJ	3.6 U	2.9 J	3.4 U	4.8 UJ	3.5 UJ	3.6 U	3.8 UJ	3.8 U	3.6 UJ	3.5 U
Endrin ketone	3.6 UJ	3.6 U	5.3 UJ	3.5 UJ	3.9 UJ	3.6 U	5.1 UJ	3.4 U	4.8 UJ	3.5 UJ	3.6 U	0.88 J	3.8 U	3.6 UJ	3.5 U
gamma-BHC (Lindane)	6.4 J	1.5 J	6.4 J	1.8 UJ	0.72 J	0.57 J	1.6 J	1.8 U	1.2 J	4.1 J	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
gamma-Chlordane	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1 J	11 J	1.8 U	2.4 UJ	1.8 UJ	23 J	2 UJ	2 U	1.9 UJ	1.8 U
Heptachlor	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	2.4 UJ	1.8 UJ	1.4 B	2 UJ	2 U	1.9 UJ	1.8 U
Heptachlor epoxide	1.9 UJ	1.8 U	2.7 UJ	1.8 UJ	2 UJ	1.8 U	2.6 UJ	1.8 U	2.4 UJ	1.8 UJ	1.9 U	2 UJ	2 U	1.9 UJ	1.8 U
Methoxychlor	19 UJ	18 U	27 UJ	18 UJ	20 UJ	18 U	26 UJ	18 U	24 UJ	18 UJ	19 U	20 UJ	20 U	19 UJ	18 U
Toxaphene	36 UJ	36 U	53 UJ	35 UJ	39 UJ	36 U	51 UJ	34 U	48 UJ	35 UJ	36 U	38 UJ	38 U	36 UJ	35 U
Total Metals (MG/KG)															
Aluminum	8,290	15,800	28,600	12,100	14,000	10,600	12,800	10,300	2,790	11,600	10,800	23,100	24,500	22,600	4,310
Antimony	0.1 L	0.11 L	0.11 L	0.11 L	1.2 L	0.09 L	0.26 L	0.05 L	0.08 L	0.08 L	0.08	0.14	0.12	0.22	0.04 J
Arsenic	2.4	4	7.6	2.3	21	2.4	3.9	1.7	3.7	2.7	2.4	5.7	5.7	12.7	0.71
Barium	33	54.8 J	53.1 J	50.4 J	72.4 J	45.7 J	49.8 J	49.5 J	9 J	31.8 J	32.3	28.1	30.8	31.2	17
Beryllium	0.45 J	0.6	1.4	0.56	0.49 J	0.53	0.98	0.53	0.18 J	0.51	0.95	0.52 J	0.55	0.89	0.31 J
Cadmium	1 U	0.86 U	0.1 J	1 U	0.12 J	0.85 U	0.2 J	0.89 U	0.07 J	0.03 J	0.06 J	1.1 U	0.98 U	0.03 J	0.65 U

Station ID	CAA03-SB01	CAA03-SB02		CAA03-SB03		CAA03-SB04		CAA03-SB05		CAA03-SB06	CAA03-SB07	CAA03-SB08		CAA03-SB09	CAA03-SB10
Sample ID	CAA03-SB01-1109	CAA03-SB02-1109A	CAA03-SB02-1109B	CAA03-SB03-1109A	CAA03-SB03-1109B	CAA03-SB04-1109A	CAA03-SB04-1109B	CAA03-SB05-1109A	CAA03-SB05-1109B	CAA03-SB06-1109	CAA03-SB07-1109	CAA03-SB08-1109	CAA03-SB08P-1109	CAA03-SB09-1109	CAA03-SB10-1109
Sample Date	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name															
Calcium	7,510	1,620 J	3,780 J	1,790 J	2,900 J	1,700 J	4,970 J	943 J	1,990 J	13,200 J	10,400	862	714	350	107
Chromium	12 K	18.1	49.6	14.6	33.3	13.7	23.8	11.5	6.8	16	17.6	33.6	35.6	46.2	6
Cobalt	2.7	3.4	9.8	2.8	3.5	3	4.1	2.7	0.68	2.6	3.5	3	3.1	3.9	1
Copper	4.9 K	3.6	14.8	3.6	9	2.9	5.7	3	2.2 B	3.3	9.4	3.4	3.8	4	1.4 J
Cyanide	0.84 U	0.77 U	1.1 U	0.84 U	0.91 U	0.7 U	0.98 U	0.77 U	0.98 U	0.7 U	0.77 U	0.84 U	0.77 U	0.7 U	0.7 U
Iron	8,040	16,000 J	30,300 J	10,000 J	22,700 J	11,100 J	12,300 J	7,800 J	2,850 J	9,950 J	12,300	22,400	22,900	31,800	3,390
Lead	10 K	12.9	16.7	14.9	23.4	10.8	8.2	9	3.5	9.6	20	11.3	10.8	9.8	3.8
Magnesium	823 K	907 J	7,120 J	864 J	3,600 J	785 J	1,680 J	707 J	351 J	1,120 J	2,780	1,530	1,580	2,710	355
Manganese	64.1 K	161 J	410 J	86.4 J	79.4 J	92.8 J	30 J	122 J	13.1 J	46.8 J	259	27.3	26.8	30.5	20.7
Mercury	0.036 U	0.06	0.05 J	0.02 J	0.06	0.03 J	0.04 J	0.01 J	0.045 U	0.01 J	0.02 J	0.02 J	0.02 J	0.01 J	0.01 J
Nickel	4.1 J	5.3	22.4	5	32.4	4.5	8.2	4.4	1.4 J	5.3	7.4	6.5	6.8	8.9	2.1 J
Potassium	826 K	734 K	4,770 K	702 K	695 K	605 K	2,010 K	593 K	343 K	1,110 K	996	1,690	1,740	3,660	235
Selenium	0.35 J	0.51	0.71	0.32 J	0.36 J	0.34 J	0.65	0.29 J	0.13 J	0.31 J	0.43	0.4 J	0.47 J	0.41 J	0.23 J
Silver	1.6 U	1.3 U	2.1 U	1.6 U	1.7 U	1.3 U	1.6 U	1.3 U	1.5 U	1.4 U	1.2 U	0.44 J	0.21 J	0.82 J	0.98 U
Sodium	66.8 K	37.2 K	690 K	43.3 K	77.2 K	39.6 K	60.2 K	27.9 K	20.8 K	101 K	70.8 J	38.9 J	39.9 J	42.3 J	12.8 J
Thallium	0.11 B	0.18 B	0.26 B	0.13 B	0.11 B	0.13 B	0.16 B	0.11 B	0.04 B	0.11 B	0.12 B	0.2 B	0.2 B	0.22 B	0.06 B
Vanadium	14.8	29.2	55.2	20.2	30.4	20.1	31.6	16.8	7.1	20.9	23.8	51.1	52.2	57	6.5
Zinc	16.4 K	20.2	86.8	21.1	158	18.1	26.6	15.1	6.9	15.5	39.6	20.9	21.3	28.1	8.1
Wet Chemistry															
pH	8.1	7.6	7.9	8.2	7.7	8.3	7.6	7.3	7.4	8.4	7.2	5.2	5.2	4.6	5
Total organic carbon (TOC) (UG/G)	3,900	8,400	17,000	5,400	11,000	18,000	32,000	5,300	24,000	3,600	14,000	11,000	9,200	5,700	6,700
Grain Size (PCT/P)															
GS07 Sieve 1" (25.0 mm)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
GS08 Sieve 0.75" (19.0 mm)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
GS09 Sieve 0.5" (12.5 mm)	100	100	100	100	93	100	100	100	100	100	100	100	100	100	100
GS10 Sieve 0.375" (9.5 mm)	100	98	100	100	82	99	100	100	100	100	100	100	100	100	100
Sieve No. 004 (4.75 mm)	99	95	100	100	78	98	99	99	99	99	98	100	100	100	100
Sieve No. 010 (2.00 mm)	98	93	100	99	75	97	98	99	99	97	93	100	100	100	100
Sieve No. 020 (850 um)	97	91	100	98	73	96	96	99	98	95	89	99	99	100	99
Sieve No. 040 (425 um)	92	87	99	94	67	90	94	94	96	91	84	98	97	99	95
Sieve No. 060 (250 um)	70	73	99	77	55	73	84	79	76	66	67	81	78	84	72
Sieve No. 100 (150 um)	47	51	98	56	39	54	46	55	30	44	47	52	49	57	36
Sieve No. 200 (75 um)	35	39	94	43	30	41	25	42	12	34	38	39	38	45	22

Notes:

Shading indicates detections

B - Analyte not detected above the level reported in associated blanks

J - Analyte present, value may or may not be accurate or precise

K - Analyte present, value may be biased high, actual value may be lower

L - Analyte present, value may be biased low, actual value may be higher

NA - Not analyzed

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UL - Analyte not detected, quantitation limit is probably higher

MG/KG - Milligrams per kilogram

PCT/P - Percent Passed

PH - pH units

UG/G - Micrograms per gram

UG/KG - Micrograms per kilogram

CTO-190
Cheatham Annex AOC 3
Sediment Data Raw Analytical Results
November 2009

Station ID	CAA03-SD01		CAA03-SD02		CAA03-SD03		CAA03-SD04	
Sample ID	CAA03-SD01-1209A	CAA03-SD01-1209B	CAA03-SD02-1209A	CAA03-SD02-1209B	CAA03-SD03-1209A	CAA03-SD03-1209B	CAA03-SD04-1209A	CAA03-SD04-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name								
Volatile Organic Compounds (UG/KG)								
1,1,1-Trichloroethane	10 UJ	8 U	26 UJ	9 UJ	9 UJ	7 U	8 UJ	8 UJ
1,1,2,2-Tetrachloroethane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10 UJ	8 U	26 UJ	9 UJ	9 UJ	7 U	8 UJ	8 UJ
1,1,2-Trichloroethane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,1-Dichloroethane	10 UJ	8 UJ	26 UJ	9 UJ	9 UJ	7 U	8 UJ	8 UJ
1,1-Dichloroethene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,2,4-Trichlorobenzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,2-Dibromo-3-chloropropane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,2-Dibromoethane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,2-Dichlorobenzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,2-Dichloroethane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,2-Dichloropropane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,3-Dichlorobenzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
1,4-Dichlorobenzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
2-Butanone	40 UJ	35 U	39 J	110 J	36 UJ	30 U	56 J	13 J
2-Hexanone	40 UJ	35 U	110 UJ	37 UJ	36 UJ	30 U	35 UJ	32 UJ
4-Methyl-2-pentanone	40 UJ	35 U	110 UJ	37 UJ	36 UJ	30 U	35 UJ	32 UJ
Acetone	140 J	12 B	270 J	420 J	74 J	60 B	250 J	88 J
Benzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Bromodichloromethane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Bromoform	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Bromomethane	16 UJ	14 U	43 UJ	15 UJ	14 UJ	12 U	14 UJ	13 UJ
Carbon disulfide	8 UJ	7 U	21 UJ	7 UJ	2 J	6 U	3 J	6 UJ
Carbon tetrachloride	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Chlorobenzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Chloroethane	16 UJ	14 U	43 UJ	15 UJ	14 UJ	12 U	14 UJ	13 UJ
Chloroform	10 UJ	8 U	26 UJ	9 UJ	9 UJ	7 U	8 UJ	8 UJ
Chloromethane	16 UJ	14 U	43 UJ	15 UJ	14 UJ	12 U	14 UJ	13 UJ
cis-1,2-Dichloroethene	10 UJ	8 U	26 UJ	9 UJ	9 UJ	7 U	8 UJ	8 UJ
cis-1,3-Dichloropropene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Cyclohexane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Dibromochloromethane	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Dichlorodifluoromethane (Freon-12)	16 UJ	14 U	43 UJ	15 UJ	14 UJ	12 U	14 UJ	13 UJ
Ethylbenzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Isopropylbenzene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
m- and p-Xylene	18 UJ	15 U	47 UJ	16 UJ	16 UJ	13 U	16 UJ	14 UJ
Methyl acetate	15 UJ	12 U	38 UJ	13 UJ	13 UJ	11 U	5 J	4 J
Methylcyclohexane	8 UJ	7 U	4 J	2 J	7 UJ	6 U	7 UJ	6 UJ
Methylene chloride	40 UJ	35 U	110 UJ	37 UJ	36 UJ	30 U	35 UJ	32 UJ
Methyl-tert-butyl ether (MTBE)	15 UJ	12 U	38 UJ	13 UJ	13 UJ	11 U	13 UJ	12 UJ
o-Xylene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Styrene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
Tetrachloroethene	50 J	42	49 J	23 J	5 J	9	11 J	8 J
Toluene	8 UJ	7 U	21 UJ	7 UJ	7 UJ	6 U	7 UJ	6 UJ
trans-1,2-Dichloroethene	11 UJ	10 U	30 UJ	10 UJ	10 UJ	8 U	10 UJ	9 UJ
trans-1,3-Dichloropropene	11 UJ	10 U	30 UJ	10 UJ	10 UJ	8 U	10 UJ	9 UJ
Trichloroethene	10 UJ	8 U	26 UJ	9 UJ	9 UJ	7 U	8 UJ	8 UJ
Trichlorofluoromethane(Freon-11)	16 UJ	14 U	43 UJ	15 UJ	14 UJ	12 U	14 UJ	13 UJ
Vinyl chloride	16 UJ	14 U	43 UJ	15 UJ	14 UJ	12 U	14 UJ	13 UJ
Xylene, total	24 UJ	21 U	64 UJ	22 UJ	22 UJ	18 U	21 UJ	19 UJ
Semivolatile Organic Compounds (UG/KG)								
1,1-Biphenyl	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
1,2,4,5-Tetrachlorobenzene	610 U	570 U	1,800 U	650 U	610 U	490 U	560 U	510 U
2,2'-Oxybis(1-chloropropane)	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
2,4,5-Trichlorophenol	1,200 U	1,100 U	3,500 U	1,300 U	1,200 U	960 U	1,100 U	1,000 U
2,4,6-Trichlorophenol	690 U	650 U	2,000 U	740 U	700 U	560 U	640 U	590 U
2,4-Dichlorophenol	650 U	610 U	1,900 U	700 U	660 U	530 U	600 U	550 U
2,4-Dimethylphenol	720 U	680 U	2,100 U	770 U	730 U	590 U	670 U	610 U
2,4-Dinitrophenol	1,600 U	1,500 U	4,800 U	1,800 U	1,700 U	1,300 U	1,500 U	1,400 U
2,4-Dinitrotoluene	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
2,6-Dinitrotoluene	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
2-Chloronaphthalene	29 U	27 U	84 U	31 U	29 U	23 U	27 U	24 U
2-Chlorophenol	720 U	680 U	2,100 U	770 U	730 U	590 U	670 U	610 U
2-Methylnaphthalene	29 UL	27 UL	19 J	31 U	29 UL	23 UL	6.1 L	24 UL
2-Methylphenol	870 U	810 U	2,500 U	930 U	880 U	700 U	800 U	730 U
2-Nitroaniline	1,200 U	1,100 U	3,500 U	1,300 U	1,200 U	960 U	1,100 U	1,000 U
2-Nitrophenol	740 U	690 U	2,200 U	790 U	740 U	600 U	680 U	620 U
3- and 4-Methylphenol	820 U	770 U	2,400 U	880 U	830 U	670 U	760 U	700 U
3,3'-Dichlorobenzidine	500 U	470 U	1,500 U	540 U	510 U	410 U	470 U	430 U
3-Nitroaniline	1,200 U	1,100 U	3,500 U	1,300 U	1,200 U	960 U	1,100 U	1,000 U
4,6-Dinitro-2-methylphenol	1,600 U	1,500 U	4,600 U	1,700 U	1,600 U	1,300 U	1,500 U	1,300 U
4-Bromophenyl-phenylether	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
4-Chloro-3-methylphenol	720 U	680 U	2,100 U	770 U	730 U	590 U	670 U	610 U
4-Chloroaniline	520 U	490 U	1,500 U	560 U	520 U	420 U	480 U	440 U
4-Chlorophenyl-phenylether	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
4-Nitroaniline	1,200 U	1,100 U	3,500 U	1,300 U	1,200 U	960 U	1,100 U	1,000 U

Station ID	CAA03-SD01		CAA03-SD02		CAA03-SD03		CAA03-SD04	
Sample ID	CAA03-SD01-1209A	CAA03-SD01-1209B	CAA03-SD02-1209A	CAA03-SD02-1209B	CAA03-SD03-1209A	CAA03-SD03-1209B	CAA03-SD04-1209A	CAA03-SD04-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name								
4-Nitrophenol	1,300 U	1,200 U	3,900 U	1,400 U	1,400 U	1,100 U	1,200 U	1,100 U
Acenaphthene	29 U	27 U	300	90	4.9 J	23 U	3.2 J	24 U
Acenaphthylene	1.8 J	27 U	34 J	31 U	5 J	23 U	2.6 J	24 U
Acetophenone	780 U	730 U	2,300 U	830 U	790 U	630 U	720 U	660 U
Anthracene	4.6 J	4 J	66 J	33	16 J	2.2 J	4.1 J	24 U
Atrazine	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Benzaldehyde	520 UJ	490 UJ	1,500 U	560 U	520 UJ	420 UJ	480 UJ	440 UJ
Benzo(a)anthracene	33 B	28 B	260	120	110	15 B	16 B	24 U
Benzo(a)pyrene	31 J	28	250	110	120	16 B	13 B	24 U
Benzo(b)fluoranthene	62 J	46 B	420	200	280	32 B	31 B	24 U
Benzo(g,h,i)perylene	8.3 B	9.8 B	83 J	29 J	65 L	23 UL	27 UL	24 UL
Benzo(k)fluoranthene	19 B	18 B	130	52	82	12 B	8.5 B	24 U
bis(2-Chloroethoxy)methane	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
bis(2-Chloroethyl)ether	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
bis(2-Ethylhexyl)phthalate	140 U	140 U	420 U	150 U	150 U	120 U	130 U	67 J
Butylbenzylphthalate	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Caprolactam	640 R	600 R	1,900 R	680 R	640 R	520 R	590 R	540 R
Carbazole	6.7 B	4.8 B	34 J	12 B	19 J	2.7 B	27 U	24 U
Chrysene	30 J	34	280	130	150	17 J	19 J	24 U
Dibenz(a,h)anthracene	6.8 B	6.4 B	110 J	45 J	27 B	23 U	27 U	24 U
Dibenzofuran	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Diethylphthalate	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Dimethyl phthalate	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Di-n-butylphthalate	140 U	140 U	420 U	150 U	150 U	120 U	130 U	120 U
Di-n-octylphthalate	920 U	860 U	2,700 U	990 U	930 U	750 U	850 U	780 U
Fluoranthene	75	49	510	250	260	42	37	5 J
Fluorene	29 U	27 U	420	180	6.1 B	23 U	27 U	24 U
Hexachlorobenzene	29 U	27 U	84 U	31 U	29 U	23 U	27 U	24 U
Hexachlorobutadiene	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Hexachlorocyclopentadiene	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Hexachloroethane	29 U	27 U	84 U	31 U	29 U	23 U	27 U	24 U
Indeno(1,2,3-cd)pyrene	19 B	31 B	230	110	81	9.1 B	27 U	24 U
Isophorone	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Naphthalene	29 U	27 U	280	53	29 U	23 U	5.7 J	24 U
n-Nitroso-di-n-propylamine	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
n-Nitrosodiphenylamine	950 U	890 U	2,800 U	1,000 U	960 U	770 U	880 U	800 U
Nitrobenzene	480 U	450 U	1,400 U	510 U	480 U	390 U	440 U	400 U
Pentachlorophenol	140 UL	140 UL	110 J	150 U	150 UL	120 UL	130 UL	120 UL
Phenanthrene	38	34	420	210	100	18 J	19 J	5.7 J
Phenol	680 U	640 U	2,000 U	730 U	690 U	550 U	630 U	570 U
Pyrene	57	87	380	190	220	33	36	4.8 J
Pesticide/Polychlorinated Biphenyls (UG/KG)								
4,4'-DDD	3.6 B	4.5 UJ	97 J	21 J	6.6 J	2 B	48 J	1.3 B
4,4'-DDE	1 B	1 B	11 J	4.8 J	2.1 B	1.3 B	12 J	1.3 B
4,4'-DDT	4.8 UJ	4.5 UJ	97 J	19 J	6.3 J	2.1 B	8.7 J	0.89 B
Aldrin	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	2.1 UJ	0.85 J	2.1 UJ
alpha-BHC	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	2.1 UJ	2.3 UJ	2.1 UJ
alpha-Chlordane	2.5 UJ	2.3 UJ	7.1 UJ	2.6 J	2.4 UL	2.1 UJ	1.7 J	2.1 UJ
Aroclor-1016	26 U	25 UJ	75 UL	28 U	26 U	23 UL	25 U	22 UJ
Aroclor-1221	61 U	58 UJ	170 UL	65 U	60 U	53 UL	58 U	52 UJ
Aroclor-1232	40 U	38 UJ	120 UL	43 U	40 U	35 UL	39 U	35 UJ
Aroclor-1242	26 U	25 UJ	75 UL	28 U	26 U	23 UL	25 U	22 UJ
Aroclor-1248	27 U	26 UJ	79 UL	29 U	27 U	24 UL	26 U	24 UJ
Aroclor-1254	24 U	23 UJ	71 UL	26 U	24 U	21 UL	24 U	21 UJ
Aroclor-1260	160 J	72 J	1,200 L	580	160	16 L	100	22 UJ
beta-BHC	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	2.1 UJ	2.3 UJ	2.1 UJ
delta-BHC	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	2.1 UJ	2.3 UJ	2.1 UJ
Dieldrin	1.7 J	4.5 UJ	14 UJ	4.8 UJ	2.4 B	4.1 UJ	4.4 UJ	4.1 UJ
Endosulfan I	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	2.1 UJ	1.6 J	2.1 UJ
Endosulfan II	4.8 UJ	4.5 UJ	110 J	2.3 J	4.7 UL	4.1 UJ	1.3 J	4.1 UJ
Endosulfan sulfate	4.8 UJ	4.5 UJ	14 UJ	4.8 UJ	35 J	4.1 UJ	14 J	4.1 UJ
Endrin	17 J	39 J	14 UJ	4.8 UJ	4.7 UL	4.1 UJ	4.4 UJ	4.1 UJ
Endrin aldehyde	3.3 J	4.5 UJ	14 UJ	4.8 UJ	4.2 J	4.1 UJ	4.4 UJ	4.1 UJ
Endrin ketone	4.8 UJ	4.5 UJ	14 UJ	4.8 UJ	4.7 UL	4.1 UJ	4.4 UJ	4.1 UJ
gamma-BHC (Lindane)	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	2.1 UJ	2.3 UJ	2.1 UJ
gamma-Chlordane	2.5 UJ	2.3 UJ	11 J	3 J	1.1 L	2.1 UJ	2.1 J	2.1 UJ
Heptachlor	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	2.1 UJ	0.69 J	2.1 UJ
Heptachlor epoxide	2.5 UJ	2.3 UJ	7.1 UJ	2.5 UJ	2.4 UL	0.71 J	2.3 UJ	2.1 UJ
Methoxychlor	25 UJ	23 UJ	71 UJ	25 UJ	24 UL	21 UJ	23 UJ	21 UJ
Toxaphene	48 UJ	45 UJ	140 UJ	48 UJ	47 UL	41 UJ	44 UJ	41 UJ
Total Metals (MG/KG)								
Aluminum	17,800	10,300	15,000	6,100	6,490	20,600	5,090	13,500
Antimony	0.5 L	0.14 L	2.2 L	0.76 B	0.79 UL	0.66 L	0.86 UL	0.72 UL
Arsenic	17.9 K	7.7 K	43.6 L	14 L	6.8 K	9.1 K	7.4 K	7.5 K
Barium	56	32.2	118	38.5	21.6	28.3	80.1	46.6
Beryllium	0.98	0.52 J	0.87 J	0.34 J	0.4 J	1	0.3 J	0.45 J
Cadmium	0.45	0.33	2.9	1.3	0.6	0.14	0.46	0.05 J

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Cheatham Annex AOC 3
Sediment Data Raw Analytical Results
November 2009

Station ID	CAA03-SD01		CAA03-SD02		CAA03-SD03		CAA03-SD04	
Sample ID	CAA03-SD01-1209A	CAA03-SD01-1209B	CAA03-SD02-1209A	CAA03-SD02-1209B	CAA03-SD03-1209A	CAA03-SD03-1209B	CAA03-SD04-1209A	CAA03-SD04-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name								
Calcium	12,400	3,750	15,400	4,120	2,060	1,740	1,570	1,180
Chromium	43.1 K	23.6 K	29.2 L	11.3 L	12.7 K	42.1 K	8.9 K	17.8 K
Cobalt	3.6 J	2 J	3.2 J	1.2 J	1.8 J	3.9 J	1.3 J	3 J
Copper	4.1	5	85.3 J	20.5 J	26.3	17.2	7.6	4.5
Cyanide	0.91 U	0.84 U	2.7 U	0.98 U	0.98 U	0.77 U	0.98 U	0.91 U
Iron	24,700 J	14,000 J	23,900	7,220	9,860 J	34,000 J	6,910 J	16,500 J
Lead	13.5	27.9	41.8	16.4	15.9	14.3	230	18.6
Magnesium	2,500 K	1,450 K	2,690	739	1,010 K	3,170 K	499 K	894 K
Manganese	37.3 J	31.8 J	119	31.2	59.1 J	34.8 J	17.3 J	23.2 J
Mercury	0.03 J	0.03 J	0.14	0.06	0.02 J	0.02 J	0.02 J	0.02 J
Nickel	10.7	5.9	13.4	4.5	4	9.4 J	3.3 J	5.4
Potassium	2,170 K	1,330 K	1,100 K	471 K	1,210 K	4,390 K	560 K	852 K
Selenium	0.43 B	0.39 B	1.4 J	0.85 U	0.36 B	1.1 B	0.24 B	0.25 B
Silver	0.15 J	0.12 J	4.1 U	1.3 U	0.2 J	0.31 J	0.15 J	0.15 J
Sodium	65.7 B	152 B	235 J	62.7 B	27 B	47.9 B	24.2 B	30.7 B
Thallium	0.53 J	1.8 U	4.1 U	1.3 U	1.5 U	0.39 J	1.6 U	1.3 U
Vanadium	53.8 K	30.4 K	38.1	14.7	17.2 K	51.4 K	12.3 K	28 K
Zinc	29.6 K	29 K	207	83.5	89.7 K	51.6 K	60 K	18.7 K
Acid Volatile Sulfide/Simultaneously Extractable Metals (UMOL/G)								
Zinc, SEM	0.0318 K	0.0147 B	1.6	0.485	0.705 K	0.154 K	0.498 K	0.401 K
Acid volatile sulfide	0.15 U	0.14 U	0.79	0.16 U	0.15 U	0.13 U	4.6	0.84
Cadmium, SEM	6.70E-04 J	0.0011 J	0.0171	0.0046	0.0021 J	4.00E-04 J	0.0019 J	0.0015 J
Copper, SEM	0.0135 L	0.0094 L	0.397	0.227	0.0627 L	0.348 L	0.0068 L	0.0185 L
Lead, SEM	0.0195 J	0.0149 J	0.108	0.0463	0.0327 J	0.0197 J	0.527 J	0.621 J
Mercury, SEM	7.60E-05 R	3.10E-05 J	2.10E-04 U	7.60E-05 U	7.50E-05 R	6.30E-05 R	7.10E-05 R	6.20E-05 R
Nickel, SEM	0.0045 B	0.0032 B	0.041 J	0.0239	0.0086 B	0.0028 B	0.01 B	0.0053 B
Silver, SEM	0.0042 UL	2.80E-04 J	0.0118 U	0.0042 U	2.10E-04 J	0.0035 UL	0.0039 UL	0.0035 UL
Wet Chemistry								
pH	7.6	7.1	6.2	6.5	6.9	6.1	6.8	6.9
Total organic carbon (TOC) (UG/G)	43,000	40,000	250,000	71,000	60,000	6,500	38,000	7,300

Notes:

Shading indicates detections
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
NA - Not analyzed
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

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Cheatham Annex AOC 3
Surface Soil Data Raw Analytical Results
November 2009

Station ID	CAA03-SS01	CAA03-SS02	CAA03-SS03	CAA03-SS04	CAA03-SS05	CAA03-SS06	CAA03-SS07	CAA03-SS08		CAA03-SS09	CAA03-SS10
Sample ID	CAA03-SS01-1109	CAA03-SS02-1109	CAA03-SS03-1109	CAA03-SS04-1109	CAA03-SS05-1109	CAA03-SS06-1109	CAA03-SS07-1109	CAA03-SS08-1109	CAA03-SS08P-1109	CAA03-SS09-1109	CAA03-SS10-1109
Sample Date	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name											
Volatile Organic Compounds (UG/KG)											
1,1,1-Trichloroethane	6 UJ	7 UJ	8 UJ	7 UJ	6 UJ	7 UJ	6 UJ	7 UJ	8 UJ	7 UJ	8 UJ
1,1,2,2-Tetrachloroethane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	6 UJ	7 UJ	8 UJ	7 UJ	6 UJ	7 UJ	6 UJ	7 UJ	8 UJ	7 UJ	8 UJ
1,1,2-Trichloroethane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,1-Dichloroethane	6 UJ	7 UJ	8 UJ	7 UJ	6 UJ	7 UJ	6 UJ	7 UJ	8 UJ	7 UJ	8 UJ
1,1-Dichloroethene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,2,4-Trichlorobenzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,2-Dibromo-3-chloropropane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,2-Dibromoethane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,2-Dichlorobenzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,2-Dichloroethane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,2-Dichloropropane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,3-Dichlorobenzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
1,4-Dichlorobenzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
2-Butanone	25 UJ	29 UJ	32 UJ	28 UJ	25 UJ	29 UJ	25 UJ	31 UJ	34 UJ	24 J	22 J
2-Hexanone	25 UJ	29 UJ	32 UJ	28 UJ	25 UJ	29 UJ	25 UJ	31 UJ	34 UJ	31 UJ	34 UJ
4-Methyl-2-pentanone	25 UJ	29 UJ	32 UJ	28 UJ	25 UJ	29 UJ	25 UJ	31 UJ	34 UJ	31 UJ	34 UJ
Acetone	82 B	74 B	71 B	78 B	100 J	43 B	54 B	110 B	100 B	640 J	560 J
Benzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Bromodichloromethane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Bromoform	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Bromomethane	10 UJ	12 UJ	13 UJ	11 UJ	10 UJ	12 UJ	10 UJ	12 UJ	14 UJ	12 UJ	14 UJ
Carbon disulfide	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Carbon tetrachloride	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Chlorobenzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Chloroethane	10 UJ	12 UJ	13 UJ	11 UJ	10 UJ	12 UJ	10 UJ	12 UJ	14 UJ	12 UJ	14 UJ
Chloroform	6 UJ	7 UJ	8 UJ	7 UJ	0.6 J	7 UJ	6 UJ	7 UJ	8 UJ	0.9 J	0.6 J
Chloromethane	10 UJ	12 UJ	13 UJ	11 UJ	10 UJ	12 UJ	10 UJ	12 UJ	14 UJ	12 UJ	14 UJ
cis-1,2-Dichloroethene	6 UJ	7 UJ	8 UJ	7 UJ	6 UJ	7 UJ	6 UJ	7 UJ	8 UJ	7 UJ	8 UJ
cis-1,3-Dichloropropene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Cyclohexane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Dibromochloromethane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Dichlorodifluoromethane (Freon-12)	10 UJ	12 UJ	13 UJ	11 UJ	10 UJ	12 UJ	10 UJ	12 UJ	14 UJ	12 UJ	14 UJ
Ethylbenzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Isopropylbenzene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
m- and p-Xylene	11 UJ	13 UJ	14 UJ	12 UJ	11 UJ	13 UJ	11 UJ	14 UJ	15 UJ	14 UJ	15 UJ
Methyl acetate	9 UJ	10 UJ	12 UJ	10 UJ	9 UJ	10 UJ	9 UJ	11 UJ	12 UJ	11 UJ	12 UJ
Methylcyclohexane	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Methylene chloride	25 UJ	9 J	32 UJ	12 J	25 UJ	13 J	25 UJ	31 UJ	34 UJ	31 UJ	34 UJ
Methyl-tert-butyl ether (MTBE)	9 UJ	10 UJ	12 UJ	10 UJ	9 UJ	10 UJ	9 UJ	11 UJ	12 UJ	11 UJ	12 UJ
o-Xylene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Styrene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	1 J	7 UJ	6 UJ	10 J
Tetrachloroethene	5 UJ	6 UJ	6 UJ	6 UJ	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	7 UJ
Toluene	5 UJ	6 UJ	6 UJ	4 B	5 UJ	6 UJ	5 UJ	6 UJ	7 UJ	6 UJ	3 J
trans-1,2-Dichloroethene	7 UJ	8 UJ	9 UJ	8 UJ	7 UJ	8 UJ	7 UJ	9 UJ	10 UJ	9 UJ	10 UJ
trans-1,3-Dichloropropene	7 UJ	8 UJ	9 UJ	8 UJ	7 UJ	8 UJ	7 UJ	9 UJ	10 UJ	9 UJ	10 UJ
Trichloroethene	6 UJ	7 UJ	8 UJ	7 UJ	6 UJ	7 UJ	6 UJ	7 UJ	8 UJ	7 UJ	8 UJ
Trichlorofluoromethane(Freon-11)	10 UJ	12 UJ	13 UJ	11 UJ	10 UJ	12 UJ	10 UJ	12 UJ	14 UJ	12 UJ	14 UJ
Vinyl chloride	10 UJ	12 UJ	13 UJ	11 UJ	10 UJ	12 UJ	10 UJ	12 UJ	14 UJ	12 UJ	14 UJ
Xylene, total	15 UJ	17 UJ	19 UJ	17 UJ	15 UJ	18 UJ	15 UJ	19 UJ	20 UJ	18 UJ	20 UJ
Semivolatile Organic Compounds (UG/KG)											
1,1-Biphenyl	380 U	390 U	390 U	380 U	340 U	3,800	340 U	420 U	410 U	350 U	350 U
1,2,4,5-Tetrachlorobenzene	490 U	500 U	490 U	480 U	440 U	510 U	440 U	540 U	530 U	450 U	440 U
2,2'-Oxybis(1-chloropropane)	380 U	390 UJ	390 U	380 UJ	340 UJ	400 UJ	340 U	420 U	410 U	350 U	350 U
2,4,5-Trichlorophenol	950 U	980 U	960 U	950 U	850 U	1,000 U	860 U	1,000 U	1,000 U	870 U	860 U
2,4,6-Trichlorophenol	560 U	570 U	560 U	560 U	500 U	580 U	500 U	620 U	600 U	510 U	510 U
2,4-Dichlorophenol	520 U	540 U	530 U	520 U	470 U	550 U	470 U	580 U	560 U	480 U	480 U
2,4-Dimethylphenol	580 U	600 U	590 U	580 U	520 U	420 J	520 U	640 U	630 U	530 U	530 U
2,4-Dinitrophenol	1,300 U	1,400 U	1,300 U	1,300 U	1,200 U	1,400 U	1,200 U	1,500 U	1,400 U	1,200 U	1,200 U
2,4-Dinitrotoluene	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
2,6-Dinitrotoluene	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
2-Chloronaphthalene	23 U	24 U	23 U	23 U	21 U	49,000 U	21 U	26 U	25 U	21 U	21 U
2-Chlorophenol	580 U	600 U	590 U	580 U	520 U	610 U	520 U	640 U	630 U	530 U	530 U
2-Methylnaphthalene	23 J	25	6.8 J	23 U	21 U	49,000 U	20 J	26 U	25 U	21 U	21 U
2-Methylphenol	700 U	720 U	700 U	690 U	620 U	440 J	630 U	770 U	750 U	640 U	630 U
2-Nitroaniline	950 U	980 U	960 U	950 U	850 U	1,000 U	860 U	1,000 U	1,000 U	870 U	860 U
2-Nitrophenol	590 U	610 U	600 U	590 U	530 U	620 U	530 U	650 U	640 U	540 U	540 U
3- and 4-Methylphenol	660 U	680 U	670 U	660 U	590 U	1,200	590 U	730 U	720 U	610 U	600 U
3,3'-Dichlorobenzidine	410 U	420 U	410 U	400 U	360 U	420 U	360 U	450 U	440 U	370 U	370 U
3-Nitroaniline	950 U	980 U	960 U	950 U	850 U	1,000 U	860 U	1,000 U	1,000 U	870 U	860 U
4,6-Dinitro-2-methylphenol	1,300 U	1,300 U	1,300 U	1,300 U	1,100 U	1,300 U	1,100 U	1,400 U	1,400 U	1,200 U	1,200 U
4-Bromophenyl-phenylether	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
4-Chloro-3-methylphenol	580 U	600 U	590 U	580 U	520 U	610 U	520 U	640 U	630 U	530 U	530 U
4-Chloroaniline	420 U	430 U	420 U	420 U	370 U	440 U	380 U	460 U	450 U	380 U	380 U
4-Chlorophenyl-phenylether	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
4-Nitroaniline	950 U	980 U	960 U	950 U	850 U	1,000 U	860 U	1,000 U	1,000 U	870 U	860 U

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Station ID	CAA03-SS01	CAA03-SS02	CAA03-SS03	CAA03-SS04	CAA03-SS05	CAA03-SS06	CAA03-SS07	CAA03-SS08		CAA03-SS09	CAA03-SS10
Sample ID	CAA03-SS01-1109	CAA03-SS02-1109	CAA03-SS03-1109	CAA03-SS04-1109	CAA03-SS05-1109	CAA03-SS06-1109	CAA03-SS07-1109	CAA03-SS08-1109	CAA03-SS08P-1109	CAA03-SS09-1109	CAA03-SS10-1109
Sample Date	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name											
4-Nitrophenol	1,100 U	1,100 U	1,100 U	1,100 U	970 U	1,100 U	970 U	1,200 U	1,200 U	990 U	980 U
Acenaphthene	61	65	27	6.9 J	21 U	24,000 J	50	26 U	25 U	21 U	21 U
Acenaphthylene	30	240	72	26	3.8 J	4,100 J	19 J	26 U	25 U	21 U	21 U
Acetophenone	630 U	640 U	630 U	620 U	560 U	660 U	560 U	690 U	680 U	580 U	570 U
Anthracene	140	260	200	37	3.8 J	140,000	150	26 U	2.7 J	21 U	21 U
Atrazine	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
Benzaldehyde	420 UJ	430 U	420 U	420 U	370 U	440 U	380 U	460 U	200 J	380 U	380 U
Benzo(a)anthracene	590	1,600	740	200	26	180,000	1,100	20 J	28	14 J	18 J
Benzo(a)pyrene	480	1,200	440	160	20 J	130,000	950	16 J	22 J	11 J	14 J
Benzo(b)fluoranthene	840	2,100	670	190 J	28 J	200,000	1,400	29	40	20 J	26
Benzo(g,h,i)perylene	130 L	440 L	70 L	23 L	21 UL	66,000 L	320 J	3.8 B	2.6 B	21 R	2.6 B
Benzo(k)fluoranthene	190	650	140	71	9.2 J	81,000	560	26 U	25 U	21 U	21 U
bis(2-Chloroethoxy)methane	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
bis(2-Chloroethyl)ether	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
bis(2-Ethylhexyl)phthalate	120 U	120 U	120 U	120 U	100 U	240,000 U	780 J	130 U	120 U	110 U	100 U
Butylbenzylphthalate	380 U	390 U	390 U	380 U	340 U	400 U	2,800	420 U	410 U	350 U	350 U
Caprolactam	510 U	530 R	520 R	510 R	460 R	530 R	460 R	560 R	550 R	470 R	460 R
Carbazole	230 J	190	80	18 J	3.2 J	120,000 J	90 J	3 J	5.6 J	3.8 J	4 J
Chrysene	730	1,300	580	170 J	17 J	210,000	1,400	18 J	26	12 J	16 J
Dibenz(a,h)anthracene	110 J	200 K	83 K	37 K	21 U	22,000 K	160	4.3 J	4.6 J	21 U	3.6 J
Dibenzofuran	380 U	390 U	390 U	380 U	340 U	19,000	340 U	420 U	410 U	350 U	350 U
Diethylphthalate	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
Dimethyl phthalate	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
Di-n-butylphthalate	120 U	120 U	120 U	120 U	100 U	240,000 U	100 U	130 U	120 U	110 U	100 U
Di-n-octylphthalate	740 U	760 U	750 U	740 U	670 U	780 U	770	820 U	800 U	680 U	680 U
Fluoranthene	1,700	3,000	1,600	350	44	500,000	2,400	40	57	31	40
Fluorene	90	130	110	11 J	21 U	40,000 J	50	26 U	25 U	21 U	21 U
Hexachlorobenzene	23 U	24 U	23 U	23 U	21 U	49,000 U	21 U	26 U	25 U	21 U	21 U
Hexachlorobutadiene	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
Hexachlorocyclopentadiene	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
Hexachloroethane	23 U	24 U	23 U	23 U	21 U	49,000 U	21 U	26 U	25 U	21 U	21 U
Indeno(1,2,3-cd)pyrene	610 K	240 J	280 J	160 J	33 J	69,000 J	920 J	25 B	29	18 B	20 B
Isophorone	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
Naphthalene	64	31	7.7 J	23 U	21 U	26,000 J	17 J	26 U	25 U	21 U	21 U
n-Nitroso-di-n-propylamine	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
n-Nitrosodiphenylamine	770 U	790 U	770 U	760 U	690 U	800 U	690 U	850 U	830 U	700 U	700 U
Nitrobenzene	380 U	390 U	390 U	380 U	340 U	400 U	340 U	420 U	410 U	350 U	350 U
Pentachlorophenol	120 U	120 UL	120 UL	120 UL	100 UL	240,000 UL	100 UJ	130 UJ	120 UJ	110 UJ	100 UJ
Phenanthrene	1,300	1,800	1,300	130	17 J	470,000	1,200	23 J	41	19 J	26
Phenol	540 U	560 U	550 U	540 U	490 U	600	490 U	600 U	590 U	500 U	500 U
Pyrene	1,400	2,400	1,000	270	26	390,000	2,800	36	54	26	36
Pesticide/Polychlorinated Biphenyls (UG/KG)											
4,4'-DDD	2.3 J	25 J	6 J	7.4 J	2.3 J	280 J	7.7 J	4 UJ	4.2 UJ	3.6 U	3.5 U
4,4'-DDE	0.96 B	83	3.5 J	7.3	1.2 J	52 J	3.2 U	4 UJ	0.8 J	3.6 U	1.7 J
4,4'-DDT	1 B	78	3.9 J	5.4 J	1.6 J	88 J	13 J	3.1 J	4.2 UJ	3.6 U	3.4 J
Aldrin	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
alpha-BHC	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
alpha-Chlordane	1.6 UJ	0.99 J	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Aroclor-1016	17 U	21 UL	20 U	21 U	20 UL	21 UJ	18 U	22 U	23 U	20 U	19 U
Aroclor-1221	40 U	49 UL	47 U	49 U	48 UL	50 UJ	41 U	51 U	53 U	46 U	44 U
Aroclor-1232	27 U	33 UL	32 U	33 U	32 UL	33 UJ	27 U	34 U	35 U	30 U	30 U
Aroclor-1242	17 U	21 UL	20 U	21 U	20 UL	21 UJ	18 U	22 U	23 U	20 U	19 U
Aroclor-1248	18 U	22 UL	21 U	22 U	22 UL	22 UJ	19 U	23 U	24 U	21 U	20 U
Aroclor-1254	16 U	20 UL	19 U	20 U	19 UL	20 UJ	17 U	21 U	21 U	18 U	18 U
Aroclor-1260	17 U	21 UL	20 U	21 U	20 UL	21 UJ	18 U	22 U	23 U	20 U	19 U
beta-BHC	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
delta-BHC	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	140 J	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Dieldrin	3.2 UJ	3.9 U	3.7 U	1.4 J	3.8 UJ	650 J	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U
Endosulfan I	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	2,200 J	1.7 U	0.79 J	0.91 J	1.8 U	1.8 U
Endosulfan II	3.2 UJ	3.9 U	3.7 U	3.9 U	3.8 UJ	78 U	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U
Endosulfan sulfate	1.9 J	8.9 J	3.7 U	3.9 U	3.8 UJ	78 U	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U
Endrin	3.2 UJ	3.9 U	16	10	3.8 UJ	130 J	3.2 U	6.8 J	16 J	55	3.9
Endrin aldehyde	3.2 UJ	3.9 U	3.8 J	2.6 J	3.8 UJ	78 U	3.2 U	3.5 J	5.4 J	3.6 U	2.2 J
Endrin ketone	3.2 UJ	3.9 U	3.7 U	3.9 U	3.8 UJ	78 U	3.2 U	4 UJ	4.2 UJ	3.6 U	3.5 U
gamma-BHC (Lindane)	5.2 J	9.6	0.82 J	2 U	1.9 UJ	860	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
gamma-Chlordane	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Heptachlor	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Heptachlor epoxide	1.6 UJ	2 U	1.9 U	2 U	1.9 UJ	40 U	1.7 U	2.1 UJ	2.1 UJ	1.8 U	1.8 U
Methoxychlor	16 UJ	20 U	19 U	20 U	19 UJ	400 U	17 U	21 UJ	21 UJ	18 U	18 U
Toxaphene	32 UJ	39 U	37 U	39 U	38 UJ	780 U	32 U	40 UJ	42 UJ	36 U	35 U
Total Metals (MG/KG)											
Aluminum	12,600	8,930	10,800	9,870	8,080	10,600	8,070	11,800	12,600	4,100	3,960
Antimony	0.13 L	0.19 L	0.25 L	0.17 L	0.07 L	0.21 L	0.07 J	0.15	0.15	0.08 J	0.07 J
Arsenic	7.3	3	3.2	3.4	1.6	3.7	2.8	3.5	3.4	2.2	1
Barium	38.5	43.6 J	47.3 J	47.7 J	36 J	55.1 J	57	28.7	29.1	11.3	16.9
Beryllium	0.66	0.67	0.49	0.46 J	0.44 J	0.72	0.69	0.34 J	0.34 J	0.19 J	0.24 J
Cadmium	0.95 U	0.12 J	0.06 J	0.04 J	0.04 J	0.33 J	0.7 J	1.1 U	1.2 U	0.92 U	0.02 B

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Station ID	CAA03-SS01	CAA03-SS02	CAA03-SS03	CAA03-SS04	CAA03-SS05	CAA03-SS06	CAA03-SS07	CAA03-SS08		CAA03-SS09	CAA03-SS10
Sample ID	CAA03-SS01-1109	CAA03-SS02-1109	CAA03-SS03-1109	CAA03-SS04-1109	CAA03-SS05-1109	CAA03-SS06-1109	CAA03-SS07-1109	CAA03-SS08-1109	CAA03-SS08P-1109	CAA03-SS09-1109	CAA03-SS10-1109
Sample Date	11/03/09	11/04/09	11/04/09	11/04/09	11/04/09	11/04/09	11/05/09	11/05/09	11/05/09	11/05/09	11/05/09
Chemical Name											
Calcium	16,900	5,960 J	2,850 J	2,870 J	612 J	18,800 J	7,950	2,920	2,630	730	318
Chromium	24.9 K	15.2	13.1	16.7	9	17.8	22.8	18.4	18.8	8.4	5.8
Cobalt	2.9	3.4	2.7	2.5	2.5	4.4	4.9	1.8	1.9	0.72	0.84
Copper	5.3 K	9.4	4.9	5	3.8	31.8	17.7	4.8	4.2	1.9 J	1.9 J
Cyanide	0.84 U	0.84 U	0.7 U	0.84 U	0.77 U	0.7 U	0.77 U	0.84 U	0.84 U	0.7 U	0.77 U
Iron	18,800	10,900 J	9,710 J	9,740 J	6,720 J	18,300 J	13,500	12,100	12,200	6,140	3,450
Lead	9.4 K	35.4	25.1	14.5	10.3	793	37	18.6	18.2	9.2	10.6
Magnesium	1,850 K	1,610 J	770 J	716 J	568 J	2,880 J	4,060	896	916	607	340
Manganese	85.1 K	155 J	121 J	106 J	98.9 J	253 J	315	39.9	35.8	19.1	27.9
Mercury	0.01 J	0.12	0.04	0.03 J	0.02 J	0.04 J	0.035 U	0.05	0.04	0.01 J	0.03 J
Nickel	5.5 J	9.8	5.3	5.2	3.7 J	9	8.8	4.5	4.7 J	1.8 J	1.9 J
Potassium	2,570 K	743 K	640 K	600 K	461 K	1,220 K	2,830	1,020	1,020	734	260
Selenium	0.36 J	0.44 J	0.45 J	0.51	0.33 J	0.84	0.16 J	0.42 J	0.47 J	0.21 J	0.24 J
Silver	1.4 U	1.6 U	1.4 U	1.5 U	1.5 U	2.1 U	1.3 U	0.25 J	0.27 J	0.29 J	0.1 J
Sodium	140 K	35 K	32.3 K	34.5 K	20.1 K	176 K	154	27.7 J	32.1 J	14.8 J	15.3 J
Thallium	0.13 B	0.17 B	0.12 B	0.13 B	0.1 B	0.13 B	0.19 B	0.14 B	0.13 B	0.09 B	0.07 B
Vanadium	27.2	19.5	20	17.8	14.6	26.9	24.3	29.1	29.5	11.4	8.6
Zinc	21.8 K	52.7	52.8	64.6	16.8	89.6	154	21.6	20.6	10	9.7
Wet Chemistry											
pH	8.5	7.7	7.6	7	6.4	8.3	8.8	6.5	5.9	4.6	5
Total organic carbon (TOC) (UG/G)	6,200	36,000	26,000	24,000	12,000	33,000	8,400	37,000	51,000	18,000	18,000
Grain Size (PCT/P)											
GS07 Sieve 1" (25.0 mm)	100	100	100	100	100	100	100	100	100	100	100
GS08 Sieve 0.75" (19.0 mm)	100	100	95	100	100	100	100	100	100	100	100
GS09 Sieve 0.5" (12.5 mm)	100	96	95	100	100	91	100	100	100	100	100
GS10 Sieve 0.375" (9.5 mm)	100	92	95	100	100	82	91	100	100	100	100
Sieve No. 004 (4.75 mm)	99	75	93	100	100	73	77	100	100	100	100
Sieve No. 010 (2.00 mm)	98	69	92	99	99	66	62	99	100	100	100
Sieve No. 020 (850 um)	96	66	90	98	99	60	50	99	99	99	99
Sieve No. 040 (425 um)	92	62	85	93	94	54	41	96	95	97	94
Sieve No. 060 (250 um)	72	51	70	76	74	39	32	78	76	73	72
Sieve No. 100 (150 um)	46	36	50	55	53	26	24	48	46	34	37
Sieve No. 200 (75 um)	36	28	38	41	40	18	17	35	36	16	24

Notes:

Shading indicates detections
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
NA - Not analyzed
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

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Station ID	CAA03-SW01		CAA03-SW02	CAA03-SW03	CAA03-SW04
Sample ID	CAA03-SW01-1209	CAA03-SW01P-1209	CAA03-SW02-1209	CAA03-SW03-1209	CAA03-SW04-1209
Sample Date	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09
Chemical Name					
Volatile Organic Compounds (UG/L)					
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	2 U	2 U	2 U	2 U	2 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	2 U	2 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	2 U	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U	5 U
2-Hexanone	6 U	6 U	6 U	6 U	6 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U
Acetone	7 U	7 U	3 B	7 U	3 B
Benzene	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U
Bromomethane	2 U	2 U	2 U	2 U	2 U
Carbon disulfide	1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U
Chloroethane	2 U	2 U	2 U	2 U	2 U
Chloroform	1 U	1 U	1 U	1 U	1 U
Chloromethane	2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Cyclohexane	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon-12)	2 U	2 U	2 U	2 U	2 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U	1 U
m- and p-Xylene	2 U	2 U	2 U	2 U	2 U
Methyl acetate	2 U	2 U	2 U	2 U	2 U
Methylcyclohexane	1 U	1 U	1 U	1 U	1 U
Methylene chloride	5 U	5 U	5 U	5 U	5 U
Methyl-tert-butyl ether (MTBE)	2 U	2 U	2 U	2 U	2 U
o-Xylene	1 U	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	3 U	3 U	3 U	3 U	3 U
Toluene	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane(Freon-11)	2 U	2 U	2 U	2 U	2 U
Vinyl chloride	2 U	2 U	2 U	2 U	2 U
Xylene, total	3 U	3 U	3 U	3 U	3 U
Semivolatile Organic Compounds (UG/L)					
1,1-Biphenyl	9 U	9 U	9 U	10 U	9 U
1,2,4,5-Tetrachlorobenzene	9 U	9 U	9 U	10 U	9 U
2,2'-Oxybis(1-chloropropane)	9 U	9 U	9 U	10 U	9 U
2,4,5-Trichlorophenol	24 U	24 U	24 U	24 U	24 U
2,4,6-Trichlorophenol	9 U	9 U	9 U	10 U	9 U
2,4-Dichlorophenol	9 U	9 U	9 U	10 U	9 U
2,4-Dimethylphenol	13 U	13 U	13 U	14 U	13 U
2,4-Dinitrophenol	24 U	24 U	24 U	24 U	24 U
2,4-Dinitrotoluene	9 U	9 U	9 U	10 U	9 U
2,6-Dinitrotoluene	9 U	9 U	9 U	10 U	9 U
2-Chloronaphthalene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
2-Chlorophenol	9 U	9 U	9 U	10 U	9 U
2-Methylnaphthalene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
2-Methylphenol	11 U	11 U	11 U	12 U	11 U
2-Nitroaniline	24 U	24 U	24 U	24 U	24 U
2-Nitrophenol	9 U	9 U	9 U	10 U	9 U
3- and 4-Methylphenol	16 U	16 U	16 U	17 U	16 U
3,3'-Dichlorobenzidine	9 U	9 U	9 U	10 U	9 U
3-Nitroaniline	24 U	24 U	24 U	24 U	24 U
4,6-Dinitro-2-methylphenol	24 U	24 U	24 U	24 U	24 U
4-Bromophenyl-phenylether	9 U	9 U	9 U	10 U	9 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	11 U	10 U
4-Chloroaniline	9 U	9 U	9 U	10 U	9 U
4-Chlorophenyl-phenylether	9 U	9 U	9 U	10 U	9 U
4-Nitroaniline	24 U	24 U	24 U	24 U	24 U

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Station ID	CAA03-SW01		CAA03-SW02	CAA03-SW03	CAA03-SW04
Sample ID	CAA03-SW01-1209	CAA03-SW01P-1209	CAA03-SW02-1209	CAA03-SW03-1209	CAA03-SW04-1209
Sample Date	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09
Chemical Name					
4-Nitrophenol	24 U	24 U	24 U	24 U	24 U
Acenaphthene	0.19 U	0.19 U	0.069 J	0.2 U	0.19 U
Acenaphthylene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Acetophenone	11 U	11 U	11 U	12 U	11 U
Anthracene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Atrazine	9 U	9 U	9 U	10 U	9 U
Benzaldehyde	9 U	9 UJ	9 U	1 B	9 U
Benzo(a)anthracene	0.19 U	0.19 U	0.14 B	0.2 U	0.19 U
Benzo(a)pyrene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Benzo(b)fluoranthene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Benzo(g,h,i)perylene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Benzo(k)fluoranthene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
bis(2-Chloroethoxy)methane	9 U	9 U	9 U	10 U	9 U
bis(2-Chloroethyl)ether	9 U	9 U	9 U	10 U	9 U
bis(2-Ethylhexyl)phthalate	0.94 U	0.94 U	0.94 U	1.1	0.94 U
Butylbenzylphthalate	9 U	9 U	9 U	10 U	9 U
Caprolactam	9 U	9 U	9 U	10 U	9 U
Carbazole	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Chrysene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Dibenz(a,h)anthracene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Dibenzofuran	9 U	9 U	9 U	10 U	9 U
Diethylphthalate	9 U	9 U	9 U	10 U	9 U
Dimethyl phthalate	9 U	9 U	9 U	10 U	9 U
Di-n-butylphthalate	0.94 U	0.94 U	0.94 U	0.98 U	0.94 U
Di-n-octylphthalate	9 U	9 U	9 U	10 U	9 U
Fluoranthene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Fluorene	0.19 U	0.19 U	0.063 B	0.2 U	0.19 U
Hexachlorobenzene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Hexachlorobutadiene	9 U	9 U	9 U	10 U	9 U
Hexachlorocyclopentadiene	9 U	9 U	9 U	10 U	9 U
Hexachloroethane	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Indeno(1,2,3-cd)pyrene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Isophorone	9 U	9 U	9 U	10 U	9 U
Naphthalene	0.19 U	0.19 U	0.066 J	0.2 U	0.19 U
n-Nitroso-di-n-propylamine	9 U	9 U	9 U	10 U	9 U
n-Nitrosodiphenylamine	11 U	11 U	11 U	12 U	11 U
Nitrobenzene	9 U	9 U	9 U	10 U	9 U
Pentachlorophenol	0.94 U	0.94 U	0.94 U	0.98 U	0.94 U
Phenanthrene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Phenol	9 U	9 U	9 U	10 U	9 U
Pyrene	0.19 U	0.19 U	0.19 U	0.2 U	0.19 U
Pesticide/Polychlorinated Biphenyls (UG/L)					
4,4'-DDD	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
4,4'-DDE	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
4,4'-DDT	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
Aldrin	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
alpha-BHC	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
alpha-Chlordane	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
Aroclor-1016	0.48 U	0.48 U	0.6 U	0.47 U	0.49 U
Aroclor-1221	0.67 U	0.67 U	0.84 U	0.66 U	0.69 U
Aroclor-1232	0.48 U	0.48 U	0.6 U	0.47 U	0.49 U
Aroclor-1242	0.57 U	0.58 U	0.72 U	0.57 U	0.59 U
Aroclor-1248	0.67 U	0.67 U	0.84 U	0.66 U	0.69 U
Aroclor-1254	0.48 U	0.48 U	0.6 U	0.47 U	0.49 U
Aroclor-1260	0.57 U	0.58 U	0.72 U	0.57 U	0.59 U
beta-BHC	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
delta-BHC	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
Dieldrin	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
Endosulfan I	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
Endosulfan II	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
Endosulfan sulfate	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
Endrin	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
Endrin aldehyde	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
Endrin ketone	0.095 U	0.096 U	0.094 U	0.094 U	0.098 U
gamma-BHC (Lindane)	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
gamma-Chlordane	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
Heptachlor	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
Heptachlor epoxide	0.048 U	0.048 U	0.047 U	0.047 U	0.049 U
Methoxychlor	0.48 U	0.48 U	0.47 U	0.47 U	0.49 U
Toxaphene	0.95 U	0.96 U	0.94 U	0.94 U	0.98 U
Total Metals (UG/L)					
Aluminum	300 U	44.3 B	26.7 B	212 J	306
Antimony	8 U	8 U	8 U	8 U	8 U
Arsenic	2.9 B	3.3 B	3.3 B	5.7 B	4.4 B
Barium	23.1	23.8	26.8	28.4	23
Beryllium	1 U	1 U	1 U	1 U	0.06 J
Cadmium	0.06 J	0.11 J	1 U	0.15 J	0.23 J

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Station ID	CAA03-SW01		CAA03-SW02	CAA03-SW03	CAA03-SW04
Sample ID	CAA03-SW01-1209	CAA03-SW01P-1209	CAA03-SW02-1209	CAA03-SW03-1209	CAA03-SW04-1209
Sample Date	12/07/09	12/07/09	12/07/09	12/07/09	12/07/09
Chemical Name					
Calcium	75,300	80,400	68,200	64,800	64,900
Chromium	1.9 B	1.7 B	1.8 B	1.6 B	1.5 B
Cobalt	0.3 J	0.34 J	0.28 J	0.44 J	0.5 J
Copper	3	3	3	6.4	6.1
Cyanide	12 U	12 U	12 U	12 U	12 U
Iron	1,070	1,010	1,970	2,410	1,550
Lead	0.32 B	0.26 B	0.28 B	1.3	0.98 J
Magnesium	1,900	1,910	2,230	1,970	1,820
Manganese	49	46.9	66.2	55.5	66.2
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1.1 B	0.92 B	0.73 B	1.5 B	1.3 B
Potassium	1,600	1,560	1,570	1,810	1,600
Selenium	5 U	5 U	5 U	5 U	5 U
Silver	1 U	1 U	1 U	0.06 J	0.07 J
Sodium	4,980	5,290	4,700	4,720	4,640
Thallium	2 U	2 U	2 U	0.35 B	2 U
Vanadium	1.7 B	0.9 B	1 B	1.4 B	1.3 B
Zinc	17.9 J	15.4 J	9.3 J	20.1 J	16.3 J
Dissolved Metals (UG/L)					
Aluminum, Dissolved	300 U	300 U	300 U	300 U	300 U
Antimony, Dissolved	8 U	8 U	8 U	8 U	8 U
Arsenic, Dissolved	5 U	5 U	5 U	2.2 B	5 U
Barium, Dissolved	24.4	23.3	25.5	21.4	21.6
Beryllium, Dissolved	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	1 U	1 U	0.05 J	1 U	0.05 J
Calcium, Dissolved	77,200	78,200	68,800	61,400	66,800
Chromium, Dissolved	2.1 B	1.8 B	1.6 B	0.74 B	0.56 B
Cobalt, Dissolved	0.29 J	0.27 J	0.28 J	0.13 J	0.26 J
Copper, Dissolved	4.2 B	2.4 B	3 B	3.6 B	3.5 B
Iron, Dissolved	30.4 J	29.8 J	30.1 J	54.3 J	55.8 J
Lead, Dissolved	0.5 B	0.22 B	0.19 B	0.08 B	0.24 B
Magnesium, Dissolved	1,880	1,880	2,300	1,920	1,810
Manganese, Dissolved	41.5	38.9	55.9	11.4	45.6
Mercury, Dissolved	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	0.83 J	1.1 J	0.97 J	0.73 J	0.88 J
Potassium, Dissolved	1,510	1,500	1,600	1,600	1,550
Selenium, Dissolved	5 U	5 U	5 U	5 U	5 U
Silver, Dissolved	1 U	1 U	1 U	1 U	1 U
Sodium, Dissolved	5,150	5,160	5,020	4,520	4,940
Thallium, Dissolved	2 U	2 U	0.16 B	0.23 B	2 U
Vanadium, Dissolved	0.92 B	0.91 B	5 U	0.72 J	5 U
Zinc, Dissolved	10.6 B	8.4 B	7.8 B	9 B	10.1 B
Wet Chemistry (UG/L)					
Hardness	196,000	NA	179,000	170,000	169,000

Notes:

Shading indicates detections

B - Analyte not detected above the level reported in associated blanks

J - Analyte present, value may or may not be accurate or precise

NA - Not analyzed

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UG/L - Micrograms per liter

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Station ID	CAS04-GW01	CAS04-GW02	CAS04-GW03	CAS04-GW04	
Sample ID	CAS04-GW01-1009	CAS04-GW02-1009	CAS04-GW03-1009	CAS04-GW04-1009	CAS04-GW04P-1009
Sample Date	10/30/09	10/30/09	10/30/09	10/30/09	10/30/09
Chemical Name					
Volatile Organic Compounds (UG/L)					
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	2 U	2 U	2 U	2 U	2 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	2 U	2 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	2 U	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U	5 U
2-Hexanone	6 U	6 U	6 U	6 U	6 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U
Acetone	3 B	3 B	7 U	4 B	5 B
Benzene	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U
Bromomethane	2 U	2 U	2 U	2 U	2 U
Carbon disulfide	2 B	2 B	2 B	2 B	2 B
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U
Chloroethane	2 U	2 U	2 U	2 U	2 U
Chloroform	1 U	1 U	1 U	1 U	1 U
Chloromethane	2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Cyclohexane	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon-12)	2 U	2 U	2 U	2 U	2 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U	1 U
m- and p-Xylene	2 U	2 U	2 U	2 U	2 U
Methyl acetate	2 U	2 U	2 U	2 U	2 U
Methylcyclohexane	1 U	1 U	1 U	1 U	1 U
Methylene chloride	5 U	5 U	5 U	5 U	5 U
Methyl-tert-butyl ether (MTBE)	2 U	2 U	2 U	2 U	2 U
o-Xylene	1 U	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	3 U	3 U	3 U	1 J	1 J
Toluene	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	0.4 J	1 U	1 U
Trichlorofluoromethane(Freon-11)	2 U	2 U	2 U	2 U	2 U
Vinyl chloride	2 U	2 U	2 U	2 U	2 U
Xylene, total	3 U	3 U	3 U	3 U	3 U
Semivolatile Organic Compounds (UG/L)					
1,1-Biphenyl	10 U	10 U	9 U	10 U	10 U
1,2,4,5-Tetrachlorobenzene	10 R	10 R	9 R	10 R	10 R
2,2'-Oxybis(1-chloropropane)	10 U	10 U	9 U	10 U	10 U
2,4,5-Trichlorophenol	26 U	24 UL	24 U	26 U	25 U
2,4,6-Trichlorophenol	10 U	10 R	9 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 UL	9 U	10 U	10 U
2,4-Dimethylphenol	15 U	14 U	13 U	14 U	14 U
2,4-Dinitrophenol	26 U	24 R	24 U	26 U	25 U
2,4-Dinitrotoluene	10 U	10 U	9 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	9 U	10 U	10 U
2-Chloronaphthalene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Chlorophenol	10 U	10 UL	9 U	10 U	10 U
2-Methylnaphthalene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
2-Methylphenol	13 U	12 U	11 U	12 U	12 U
2-Nitroaniline	26 U	24 U	24 U	26 U	25 U
2-Nitrophenol	10 U	10 UL	9 U	10 U	10 U
3- and 4-Methylphenol	18 U	16 U	16 U	17 U	17 U
3,3'-Dichlorobenzidine	10 U	10 U	9 U	10 U	10 U
3-Nitroaniline	26 U	24 U	24 U	26 U	25 U
4,6-Dinitro-2-methylphenol	26 U	24 R	24 U	26 U	25 U
4-Bromophenyl-phenylether	10 U	10 U	9 U	10 U	10 U
4-Chloro-3-methylphenol	12 U	11 U	10 U	11 U	11 U
4-Chloroaniline	10 U	10 U	9 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	9 U	10 U	10 U
4-Nitroaniline	26 U	24 U	24 U	26 U	25 U

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Station ID	CAS04-GW01	CAS04-GW02	CAS04-GW03	CAS04-GW04	
Sample ID	CAS04-GW01-1009	CAS04-GW02-1009	CAS04-GW03-1009	CAS04-GW04-1009	CAS04-GW04P-1009
Sample Date	10/30/09	10/30/09	10/30/09	10/30/09	10/30/09
Chemical Name					
4-Nitrophenol	26 U	24 R	24 U	26 U	25 U
Acenaphthene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Acenaphthylene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Acetophenone	13 U	12 U	11 U	12 U	12 U
Anthracene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Atrazine	10 U	10 U	9 U	10 U	10 U
Benzaldehyde	10 U	10 U	9 U	10 U	10 U
Benzo(a)anthracene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Benzo(a)pyrene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Benzo(b)fluoranthene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Benzo(g,h,i)perylene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Benzo(k)fluoranthene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
bis(2-Chloroethoxy)methane	10 U	10 U	9 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	9 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	1 UL	0.99 UL	0.94 UL	1 UL	1 UL
Butylbenzylphthalate	10 U	10 U	9 U	10 U	10 U
Caprolactam	10 U	10 U	9 U	10 U	10 U
Carbazole	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Chrysene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Dibenz(a,h)anthracene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Dibenzofuran	10 U	10 U	9 U	10 U	10 U
Diethylphthalate	10 U	10 U	9 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	9 U	10 U	10 U
Di-n-butylphthalate	1 U	0.99 U	0.94 U	1 U	1 U
Di-n-octylphthalate	10 U	10 U	9 U	10 U	10 U
Fluoranthene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Fluorene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Hexachlorobenzene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Hexachlorobutadiene	10 U	10 U	9 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	9 U	10 U	10 U
Hexachloroethane	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Indeno(1,2,3-cd)pyrene	0.21 UL	0.2 UL	0.19 UL	0.2 UL	0.2 UL
Isophorone	10 U	10 U	9 U	10 U	10 U
Naphthalene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
n-Nitroso-di-n-propylamine	10 U	10 U	9 U	10 U	10 U
n-Nitrosodiphenylamine	13 U	12 U	11 U	12 U	12 U
Nitrobenzene	10 U	10 U	9 U	10 U	10 U
Pentachlorophenol	1 U	0.99 U	0.94 U	1 U	1 U
Phenanthrene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Phenol	10 U	10 U	9 U	10 U	10 U
Pyrene	0.21 U	0.2 U	0.19 U	0.2 U	0.2 U
Pesticide/Polychlorinated Biphenyls (UG/L)					
4,4'-DDD	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
4,4'-DDE	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
4,4'-DDT	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
Aldrin	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
alpha-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
alpha-Chlordane	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
Aroclor-1016	0.5 U	0.5 U	0.5 U	0.5 U	0.48 U
Aroclor-1221	0.71 U	0.7 U	0.7 U	0.69 U	0.67 U
Aroclor-1232	0.5 U	0.5 U	0.5 U	0.5 U	0.48 U
Aroclor-1242	0.61 U	0.6 U	0.6 U	0.59 U	0.57 U
Aroclor-1248	0.71 U	0.7 U	0.7 U	0.69 U	0.67 U
Aroclor-1254	0.5 U	0.5 U	0.5 U	0.5 U	0.48 U
Aroclor-1260	0.61 U	0.6 U	0.6 U	0.59 U	0.57 U
beta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
Dieldrin	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
Endosulfan I	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
Endosulfan II	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
Endosulfan sulfate	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
Endrin	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
Endrin aldehyde	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
Endrin ketone	0.1 U	0.1 U	0.1 U	0.099 U	0.095 U
gamma-BHC (Lindane)	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
gamma-Chlordane	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
Heptachlor	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
Heptachlor epoxide	0.05 U	0.05 U	0.05 U	0.05 U	0.048 U
Methoxychlor	0.5 U	0.5 U	0.5 U	0.5 U	0.48 U
Toxaphene	1 U	1 U	1 U	0.99 U	0.95 U
Total Metals (UG/L)					
Aluminum	78.6 B	2,700	206 J	50.9 B	60.5 B
Antimony	0.17 J	0.4 J	0.37 J	1 U	1 U
Arsenic	5 U	7.4	1.8 J	5 U	5 U
Barium	18.6	25.7	12.1	20.6	23.3
Beryllium	1 U	0.16 J	1 U	1 U	1 U
Cadmium	1 U	0.29 J	0.07 J	0.05 J	0.06 J

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Station ID	CAS04-GW01	CAS04-GW02	CAS04-GW03	CAS04-GW04	
Sample ID	CAS04-GW01-1009	CAS04-GW02-1009	CAS04-GW03-1009	CAS04-GW04-1009	CAS04-GW04P-1009
Sample Date	10/30/09	10/30/09	10/30/09	10/30/09	10/30/09
Chemical Name					
Calcium	126,000	129,000	83,200	132,000	147,000
Chromium	0.77 J	9.8 J	1.2 J	15 U	0.44 J
Cobalt	0.58 J	1.3 J	30 U	0.88 J	1 J
Copper	25 U	1.4 B	25 U	5.1 J	1.5 B
Cyanide	12 U	12 U	12 U	12 U	12 U
Iron	387	5,010	296	9.7 B	10.5 B
Lead	5 U	3 J	5 U	5 U	1.2 J
Magnesium	2,070	2,360	946	1,880	2,080
Manganese	179	48	26.9	41.9	45.2
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1.7 J	3.5 J	0.69 J	1.3 J	1.2 J
Potassium	993 J	1,220	424 J	3,090	3,370
Selenium	10 U	10 U	10 U	10 U	10 U
Silver	15 U	15 U	15 U	15 U	15 U
Sodium	8,890	7,520	2,310	8,230	9,030
Thallium	2 U	0.32 B	0.11 B	2 U	0.35 B
Vanadium	25 U	11.1 J	25 U	25 U	25 U
Zinc	25 U	9 J	4 J	7.2 J	2.9 J
Dissolved Metals (UG/L)					
Aluminum, Dissolved	44.4 B	395	64.4 B	52.4 B	32.2 B
Antimony, Dissolved	0.18 J	0.22 J	0.26 J	0.16 J	1 U
Arsenic, Dissolved	1.6 J	1.8 J	1.9 J	2 J	1.7 J
Barium, Dissolved	19.4	19.4	11.6	21.2	20.2
Beryllium, Dissolved	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	1 U	0.11 J	1 U	0.06 J	0.07 J
Calcium, Dissolved	131,000	126,000	80,700	136,000	131,000
Chromium, Dissolved	15 U	1.6 J	15 U	15 U	15 U
Cobalt, Dissolved	0.7 J	0.56 J	30 U	0.87 J	0.8 J
Copper, Dissolved	25 U	25 U	25 U	25 U	25 U
Iron, Dissolved	299	840	38.8 B	100 U	100 U
Lead, Dissolved	5 U	5 U	1 J	5 U	5 U
Magnesium, Dissolved	2,160	1,950	905	1,920	1,840
Manganese, Dissolved	184	41.8	24.7	41.6	42
Mercury, Dissolved	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	2 J	1 J	0.29 J	1.2 J	1.1 J
Potassium, Dissolved	1,080	776 J	380 J	3,180	3,060
Selenium, Dissolved	4.3 B	10 U	10 U	10 U	10 U
Silver, Dissolved	15 U	15 U	15 U	15 U	15 U
Sodium, Dissolved	9,230	7,450	2,280	8,440	7,970
Thallium, Dissolved	2 U	0.13 B	2 U	0.58 B	0.2 B
Vanadium, Dissolved	25 U	25 U	25 U	25 U	25 U
Zinc, Dissolved	4.2 J	3.5 J	2.2 J	25 U	2.2 J

Notes:

Shading indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
R - Unreliable Result
U - The material was analyzed for, but not detected
UL - Analyte not detected, quantitation limit is probably higher
UG/L - Micrograms per liter

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Station ID	CAS004-4HA02	CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS004-4HA06	CAS04-SB01	CAS04-SB02	CAS04-SB03	CAS04-SB04	CAS04-SB05
Sample ID	CAS004-4-HA02-02-1199	CAS004-4-HA03-02-1199	CAS004-4-HA04-01-1199	CAS004-4-HA05-01-1199	CAS004-4-HA06-02-1199	CAS04-SB01-1109	CAS04-SB02-1109	CAS04-SB03-1109	CAS04-SB04-1109	CAS04-SB05-1109
Sample Date	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Chemical Name										
Volatile Organic Compounds (UG/KG)										
1,1,1-Trichloroethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	7 UJ	6 UJ	6 UJ	6 UJ	7 U
1,1,2,2-Tetrachloroethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 UL	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	7 UJ	6 UJ	6 UJ	6 UJ	7 U
1,1,2-Trichloroethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,1-Dichloroethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	7 UJ	6 UJ	6 UJ	6 UJ	7 U
1,1-Dichloroethene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,2,4-Trichlorobenzene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	6 UJ	5 UJ	5 UJ	5 UJ	6 UJ
1,2-Dibromoethane	NA	NA	NA	NA	NA	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,2-Dichlorobenzene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,2-Dichloroethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,2-Dichloroethene (total)	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	NA	NA	NA	NA	NA
1,2-Dichloropropane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,3-Dichlorobenzene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
1,4-Dichlorobenzene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
2-Butanone	8 J	14.2 U	20.4 U	13.0 U	12.8 U	28 UJ	27 UJ	27 UJ	27 UJ	28 U
2-Hexanone	13.7 U	14.2 U	20.4 U	13.0 U	12.8 UL	28 UJ	27 UJ	27 UJ	27 UJ	28 U
4-Methyl-2-pentanone	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	28 UJ	27 UJ	27 UJ	27 UJ	28 U
Acetone	43 B	14.2 U	20.4 U	13.0 U	12.8 U	74 B	46 B	76 B	120 J	98
Benzene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Bromodichloromethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Bromoform	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Bromomethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	11 UJ	11 UJ	11 UJ	11 UJ	11 U
Carbon disulfide	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Carbon tetrachloride	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Chlorobenzene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 UL	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Chloroethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	11 UJ	11 UJ	11 UJ	11 UJ	11 U
Chloroform	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	7 UJ	6 UJ	6 UJ	1 J	7 U
Chloromethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	11 UJ	11 UJ	11 UJ	11 UJ	11 U
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	7 UJ	6 UJ	6 UJ	6 UJ	7 U
cis-1,3-Dichloropropene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Cyclohexane	NA	NA	NA	NA	NA	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Dibromochloromethane	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	11 UJ	11 UJ	11 UJ	11 UJ	11 U
Ethylbenzene	2 J	14.2 U	20.4 U	13.0 U	12.8 UL	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Isopropylbenzene	NA	NA	NA	NA	NA	6 UJ	5 UJ	5 UJ	5 UJ	6 U
m- and p-Xylene	NA	NA	NA	NA	NA	12 UJ	12 UJ	12 UJ	12 UJ	12 U
Methyl acetate	NA	NA	NA	NA	NA	10 UJ	10 UJ	10 UJ	10 UJ	10 U
Methylcyclohexane	NA	NA	NA	NA	NA	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Methylene chloride	7 B	17 B	13 B	12 B	20 B	28 UJ	27 UJ	27 UJ	12 J	28 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	10 UJ	10 UJ	10 UJ	10 UJ	10 U
o-Xylene	NA	NA	NA	NA	NA	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Styrene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 UL	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Tetrachloroethene	13.7 U	3 J	20.4 U	13.0 U	12.8 UL	6 UJ	5 UJ	5 UJ	5 UJ	6 U
Toluene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 UL	6 UJ	5 UJ	5 UJ	2 J	6 U
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	8 UJ	8 UJ	7 UJ	8 UJ	8 U
trans-1,3-Dichloropropene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	8 UJ	8 UJ	7 UJ	8 UJ	8 U
Trichloroethene	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	7 UJ	6 UJ	6 UJ	6 UJ	7 U
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	11 UJ	11 UJ	11 UJ	11 UJ	11 U
Vinyl chloride	13.7 U	14.2 U	20.4 U	13.0 U	12.8 U	11 UJ	11 UJ	11 UJ	11 UJ	11 U
Xylene, total	13.7 U	14.2 U	20.4 U	13.0 U	12.8 UL	17 UJ	16 UJ	16 UJ	16 UJ	17 U
Semivolatile Organic Compounds (UG/KG)										
1,1-Biphenyl	NA	NA	NA	NA	NA	370 U	330 U	390 U	350 U	380 U
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA	480 U	420 U	490 U	440 U	480 U
2,2'-Oxybis(1-chloropropane)	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 UJ	350 U	380 U
2,4,5-Trichlorophenol	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	930 U	830 U	960 U	870 U	940 U
2,4,6-Trichlorophenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	540 U	490 U	560 U	510 U	550 U
2,4-Dichlorophenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	510 U	460 U	530 U	480 U	520 U
2,4-Dimethylphenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	560 U	510 U	580 U	530 U	580 U
2,4-Dinitrophenol	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	1,300 U	1,200 U	1,300 U	1,200 U	1,300 U
2,4-Dinitrotoluene	480 U	450 U	450 U	450 U	480 U	370 U	330 U	390 U	350 U	380 U
2,6-Dinitrotoluene	480 U	450 U	450 U	450 U	480 U	370 U	330 U	390 U	350 U	380 U
2-Chloronaphthalene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
2-Chlorophenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	560 U	510 U	580 U	530 U	580 U
2-Methylnaphthalene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
2-Methylphenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	680 U	610 U	700 U	640 U	690 U
2-Nitroaniline	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	930 U	830 U	960 U	870 U	940 U
2-Nitrophenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	580 U	520 U	600 U	540 U	590 U
3- and 4-Methylphenol	NA	NA	NA	NA	NA	640 U	580 U	670 U	600 U	660 U
3,3'-Dichlorobenzidine	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	400 U	350 U	410 U	370 U	400 U
3-Nitroaniline	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	930 U	830 U	960 U	870 U	940 U
4,6-Dinitro-2-methylphenol	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	1,200 U	1,100 U	1,300 U	1,200 U	1,300 U
4-Bromophenyl-phenylether	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
4-Chloro-3-methylphenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	560 U	510 U	580 U	530 U	580 U
4-Chloroaniline	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	410 U	360 U	420 U	380 U	420 U
4-Chlorophenyl-phenylether	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U

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Station ID	CAS004-4HA02	CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS004-4HA06	CAS04-SB01	CAS04-SB02	CAS04-SB03	CAS04-SB04	CAS04-SB05
Sample ID	CAS004-4-HA02-02-1199	CAS004-4-HA03-02-1199	CAS004-4-HA04-01-1199	CAS004-4-HA05-01-1199	CAS004-4-HA06-02-1199	CAS04-SB01-1109	CAS04-SB02-1109	CAS04-SB03-1109	CAS04-SB04-1109	CAS04-SB05-1109
Sample Date	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Chemical Name										
4-Methylphenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	NA	NA	NA	NA	NA
4-Nitroaniline	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	930 U	830 U	960 U	870 U	940 U
4-Nitrophenol	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	1,000 U	940 U	1,100 U	990 U	1,100 U
Acenaphthene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Acenaphthylene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Acetophenone	NA	NA	NA	NA	NA	610 U	550 U	630 U	570 U	620 U
Anthracene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Atrazine	NA	NA	NA	NA	NA	370 U	330 U	390 U	350 U	380 U
Benzaldehyde	NA	NA	NA	NA	NA	410 UJ	360 UJ	420 U	380 U	420 U
Benzo(a)anthracene	77 J	11,000 UJ	17,000 UJ	4,300 U	500 J	8.5 J	7.3 J	6.2 J	21 U	6.2 J
Benzo(a)pyrene	110 J	11,000 UJ	17,000 UJ	550 J	600 J	23 U	20 U	23 U	21 U	23 U
Benzo(b)fluoranthene	130 J	11,000 UJ	17,000 UJ	510 J	490 J	23 U	20 U	23 U	21 U	23 U
Benzo(g,h,i)perylene	79 J	11,000 UJ	17,000 UJ	4,300 U	440 J	23 UL	20 UL	23 UL	21 UL	23 UL
Benzo(k)fluoranthene	64 J	11,000 UJ	17,000 UJ	490 J	760 J	23 U	20 U	23 U	21 U	23 U
bis(2-Chloroethoxy)methane	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
bis(2-Chloroethyl)ether	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
bis(2-Ethylhexyl)phthalate	670 B	63,000 J	2,600 B	4,300 U	3,800 U	110 U	100 U	120 U	110 U	120 U
Butylbenzylphthalate	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
Caprolactam	NA	NA	NA	NA	NA	500 U	450 U	520 R	470 R	510 R
Carbazole	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Chrysene	130 J	11,000 UJ	17,000 UJ	4,300 U	620 J	23 U	20 U	23 U	21 U	23 U
Dibenz(a,h)anthracene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Dibenzofuran	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
Diethylphthalate	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
Dimethyl phthalate	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
Di-n-butylphthalate	66 B	5,700 B	90,000 J	4,300 U	3,800 U	110 U	100 U	120 U	110 U	120 U
Di-n-octylphthalate	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	720 U	650 U	750 U	680 U	740 U
Fluoranthene	160 J	11,000 UJ	17,000 UJ	880 J	880 J	23 U	20 U	23 U	21 U	23 U
Fluorene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Hexachlorobenzene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Hexachlorobutadiene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
Hexachlorocyclopentadiene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
Hexachloroethane	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Indeno(1,2,3-cd)pyrene	66 J	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
Isophorone	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
Naphthalene	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	23 U	20 U	23 U	21 U	23 U
n-Nitroso-di-n-propylamine	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	370 U	330 U	390 U	350 U	380 U
n-Nitrosodiphenylamine	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	750 U	670 U	770 U	700 U	760 U
Nitrobenzene	480 U	450 U	450 U	450 U	480 U	370 U	330 U	390 U	350 U	380 U
Pentachlorophenol	1,200 U	29,000 UJ	42,000 UJ	11,000 U	9,500 U	110 U	100 U	120 U	110 U	120 U
Phenanthrene	100 J	11,000 UJ	17,000 UJ	4,300 U	400 J	23 U	20 U	23 U	21 U	23 U
Phenol	480 U	11,000 UJ	17,000 UJ	4,300 U	3,800 U	530 U	480 U	550 U	500 U	540 U
Pyrene	210 J	11,000 UJ	17,000 UJ	930 J	670 J	23 U	20 U	23 U	21 U	23 U
Pesticide/Polychlorinated Biphenyls (UG/KG)										
4,4'-DDD	4.5 L	4.6 U	6.7 U	4.3 U	3.8 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
4,4'-DDE	5.3 P	4.6 U	24 J	10 J	3.8 U	3.6 UJ	3.3 U	3.8 UL	3.3 UJ	3.4 UJ
4,4'-DDT	5.8 P	4.6 U	13 J	150 L	8.4 J	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Aldrin	2.5 UL	2.4 U	3.4 U	27 J	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
alpha-BHC	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
alpha-Chlordane	2.5 UL	2.4 U	3.4 U	2.4 J	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Aroclor-1016	48 UL	46 U	67 U	43 U	38 U	20 U	18 U	21 U	18 U	18 U
Aroclor-1221	97 UL	93 U	140 U	87 U	76 U	46 U	42 U	49 U	42 U	43 U
Aroclor-1232	48 UL	46 U	67 U	43 U	38 U	31 U	28 U	32 U	28 U	29 U
Aroclor-1242	48 UL	46 U	67 U	2,300 L	38 U	20 U	18 U	21 U	18 U	18 U
Aroclor-1248	48 UL	46 U	67 U	43 U	38 U	21 U	19 U	22 U	19 U	20 U
Aroclor-1254	48 UL	46 U	67 U	43 U	38 U	19 U	17 U	20 U	17 U	18 U
Aroclor-1260	48 UL	51 K	330 J	1,600 L	38 U	20 U	18 U	21 U	18 U	18 U
beta-BHC	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
delta-BHC	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Dieldrin	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Endosulfan I	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Endosulfan II	4.8 UL	6.5 K	6.7 U	4.3 U	3.8 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Endosulfan sulfate	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Endrin	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Endrin aldehyde	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
Endrin ketone	4.8 UL	4.6 U	8.9 J	19 J	3.8 U	3.6 UJ	3.3 U	3.8 U	3.3 UJ	3.4 UJ
gamma-BHC (Lindane)	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
gamma-Chlordane	2.5 UL	2.4 U	3.4 U	4.3 J	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Heptachlor	2.5 UL	2.4 U	3.4 U	9.9 J	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Heptachlor epoxide	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U	1.9 UJ	1.7 U	2 U	1.7 UJ	1.8 UJ
Methoxychlor	25 UL	24 U	34 U	25 J	19 U	19 UJ	17 U	20 U	17 UJ	18 UJ
Toxaphene	250 UL	240 U	340 U	220 U	190 U	36 UJ	33 U	38 U	33 UJ	34 UJ
Explosives (UG/KG)										
1,3,5-Trinitrobenzene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA

Station ID	CAS004-4HA02	CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS004-4HA06	CAS04-SB01	CAS04-SB02	CAS04-SB03	CAS04-SB04	CAS04-SB05
Sample ID	CAS004-4-HA02-02-1199	CAS004-4-HA03-02-1199	CAS004-4-HA04-01-1199	CAS004-4-HA05-01-1199	CAS004-4-HA06-02-1199	CAS04-SB01-1109	CAS04-SB02-1109	CAS04-SB03-1109	CAS04-SB04-1109	CAS04-SB05-1109
Sample Date	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Chemical Name										
2-Nitrotoluene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
3-Nitrotoluene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
4-Nitrotoluene	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
HMX	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
RDX	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
Tetryl	500 U	450 U	450 U	450 U	480 U	NA	NA	NA	NA	NA
Total Metals (MG/KG)										
Aluminum	3,670 L	9,660 L	7,520 L	5,850 L	3,550 L	29,400	5,310	22,800	6,400	20,700
Antimony	0.53 U	0.53 U	0.69 U	1.1 B	1.1 B	0.15 L	0.04 L	0.12 L	0.05 L	0.12 L
Arsenic	1.8 L	2.9 L	3.9 L	3.7 L	4.2 L	6.9	0.62	4.8	0.89	5.7
Barium	20.2 J	48 J	247	30.6 J	33.2 J	42.8	28.6	32 J	25.8 J	22 J
Beryllium	0.31 B	0.39 B	0.4 B	0.55 B	0.35 B	0.49 J	0.35 J	0.48	0.53	0.57
Cadmium	0.08 U	0.08 U	0.96 J	1.2 J	0.15 U	2.2 U	0.73 U	0.94 U	0.86 U	0.07 J
Calcium	478 J	4,060	5,970	3,240	2,460	744	300	278 J	183 J	108 J
Chromium	6.9	15.9	13.4	17.4	29.2	39.6 K	6.1 K	32	7.3	33.4
Cobalt	1.6 J	4.3 J	3.8 J	2.8 J	3.6 J	3.9	1.8	3.4	2.6	2.8
Copper	4.4 B	40.4	30	30.1	19.4	2.9 K	2.8 K	2.7	2 B	3.4
Cyanide	0.03 UL	0.03 UL	0.44 L	0.03 UL	0.02 UL	0.84 U	0.77 U	0.77 U	0.77 U	0.77 U
Iron	4,960 L	19,300 L	12,100 L	12,700 L	28,000 L	31,600	3,830	20,900 J	4,300 J	21,800 J
Lead	11.3	45.3	42.3	36.2	29.7	11 K	4.4 K	9.7	5.1	10.7
Magnesium	327 J	499 J	812 J	1,310 J	1,730	1,600 K	400 K	1,230 J	478 J	1,670 J
Manganese	28.3	120	105	40.4	114	32.7 K	72.8 K	28 J	47.2 J	22.7 J
Mercury	0.1 J	0.91	0.9	0.44	0.05 J	0.05	0.03 U	0.04	0.01 J	0.01 J
Nickel	3.5 B	17.3	13.6	7.7 B	20.4	8 J	2.8 J	6.7	3.6	5.8
Potassium	249 B	566 J	531 J	1,700	920 B	1,050 K	305 K	944 K	319 K	1,910 K
Selenium	0.78 J	0.72 U	0.94 U	0.79 U	0.66 U	0.51 J	0.2 J	0.45 J	0.3 J	0.26 J
Silver	1.6 B	5.8 B	3.9 B	3.7 B	8.5 L	3.2 U	1.1 U	1.4 U	1.3 U	1.4 U
Sodium	11.6 B	37.4 B	57.1 B	48.7 B	31 B	54.8 K	21.1 K	31.4 K	15.8 K	31.4 K
Thallium	0.58 UL	0.58 UL	0.75 UL	0.63 UL	0.53 UL	0.33	0.07 B	0.23 B	0.08 B	0.16 B
Vanadium	10.1 B	12.2	17.1	20.5	20.8	57.7	7.8	53.7	8.4	51.8
Zinc	28.6 B	334	373	150	236	28.2 K	7.8 K	22.6	11.5	22.2
Wet Chemistry										
pH (ph)	NA	NA	NA	NA	NA	5	5.8	4.7	5	4.4
Total organic carbon (TOC) (ug/g)	NA	NA	NA	NA	NA	4,800	3,400	6,100	5,400	3,400
Grain Size (PCT/P)										
GS07 Sieve 1" (25.0 mm)	NA	NA	NA	NA	NA	100	100	100	100	100
GS08 Sieve 0.75" (19.0 mm)	NA	NA	NA	NA	NA	100	100	100	100	100
GS09 Sieve 0.5" (12.5 mm)	NA	NA	NA	NA	NA	100	100	100	100	100
GS10 Sieve 0.375" (9.5 mm)	NA	NA	NA	NA	NA	100	100	100	100	100
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	100	100	100	100	100
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	100	100	100	100	100
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	99	99	100	99	100
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	95	95	97	95	98
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	77	66	83	73	79
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	56	36	62	41	50
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	45	27	53	27	33

Notes:

Shading indicates detections

NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
P - Difference between the concentration on the two columns is greater than 20%
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

Station ID	CAS004-4SD01		CAS004-4SD02		CAS004-4SD03		CAS004-4SD04			CAS04-SD01			
Sample ID	CAS004-4-SED01-00-1199	CAS004-4-SED01-01-1199	CAS004-4-SD02-00-1199	CAS004-4-SD02-01-1199	CAS004-4-SD03-00-1199	CAS004-4-SD03-01-1199	CAS004-4-SD04-00-1199	CAS004-4-SD04-00D-1199	CAS004-4-SD04-01-1199	CAS04-SD01-1209A	CAS04-SD01P-1209A	CAS04-SD01-1209B	CAS04-SD01P-1209B
Sample Date	11/12/99	11/12/99	11/14/99	11/14/99	11/13/99	11/13/99	11/13/99	11/13/99	11/13/99	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name													
Volatile Organic Compounds (UG/KG)													
1,1,1-Trichloroethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	6 UJ	8 UJ	7 U	7 U
1,1,2,2-Tetrachloroethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	NA	NA	NA	NA	6 UJ	8 UJ	7 U	7 U
1,1,2-Trichloroethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
1,1-Dichloroethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	6 UJ	8 UJ	7 U	7 U
1,1-Dichloroethene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
1,2,4-Trichlorobenzene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	5 UJ	6 UJ	6 U	6 U
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 UJ	6 UJ	6 U	6 U
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 UJ	6 UJ	6 U	6 U
1,2-Dichlorobenzene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	5 UJ	6 UJ	6 U	6 U
1,2-Dichloroethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
1,2-Dichloroethene (total)	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	NA	NA	NA	NA
1,2-Dichloropropane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
1,3-Dichlorobenzene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	5 UJ	6 UJ	6 U	6 U
1,4-Dichlorobenzene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	5 UJ	6 UJ	6 U	6 U
2-Butanone	12 J	7 B	15 B	14.9 U	17.5 U	13.9 U	10 B	12 B	16.0 U	26 UJ	31 UJ	28 U	30 U
2-Hexanone	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	26 UJ	31 UJ	28 U	30 U
4-Methyl-2-pentanone	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	2 J	19.9 U	26.4 U	16.0 U	26 UJ	31 UJ	28 U	30 U
Acetone	37 B	26 B	44 B	27 B	17 B	24 B	23 B	36 B	22 B	210 J	33 B	190 J	27 B
Benzene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Bromodichloromethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Bromoform	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Bromomethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	10 UJ	12 UJ	11 U	12 U
Carbon disulfide	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Carbon tetrachloride	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Chlorobenzene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Chloroethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	10 UJ	12 UJ	11 U	12 U
Chloroform	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	6 UJ	8 UJ	7 U	7 U
Chloromethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	10 UJ	12 UJ	11 U	12 U
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	6 UJ	8 UJ	7 U	7 U
cis-1,3-Dichloropropene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 UJ	6 UJ	6 U	6 U
Dibromochloromethane	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 UJ	12 UJ	11 U	12 U
Ethylbenzene	2 J	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	3 J	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 UJ	6 UJ	6 U	6 U
m- and p-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	11 UJ	14 UJ	12 U	13 U
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	9 UJ	11 UJ	10 U	11 U
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 UJ	6 UJ	6 U	6 U
Methylene chloride	24 B	21 B	18 B	16 B	39 B	36 B	12 B	15 B	36 B	26 UJ	31 UJ	28 U	30 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	9 UJ	11 UJ	10 U	11 U
o-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 UJ	6 UJ	6 U	6 U
Styrene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
Tetrachloroethene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	11 J	14	17
Toluene	15.8 U	16.9 U	3 L	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	5 UJ	6 UJ	6 U	6 U
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	7 UJ	9 UJ	8 U	8 U
trans-1,3-Dichloropropene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	7 UJ	9 UJ	8 U	8 U
Trichloroethene	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	6 UJ	8 UJ	7 U	7 U
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 UJ	12 UJ	11 U	12 U
Vinyl chloride	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	19.9 U	26.4 U	16.0 U	10 UJ	12 UJ	11 U	12 U
Xylene, total	15.8 U	16.9 U	20.5 UL	14.9 U	17.5 U	13.9 U	10 J	26.4 U	16.0 U	16 UJ	19 UJ	17 U	18 U
Semivolatile Organic Compounds (UG/KG)													
1,1-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	410 U	400 U	380 U	390 U
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	530 U	510 U	480 U	500 U
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	410 U	400 U	380 U	390 U
2,4,5-Trichlorophenol	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	1,000 U	1,000 U	940 U	980 U
2,4,6-Trichlorophenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	600 U	580 U	550 U	570 U
2,4-Dichlorophenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	560 U	550 U	520 U	540 U
2,4-Dimethylphenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	630 U	610 U	570 U	600 U
2,4-Dinitrophenol	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	1,400 U	1,400 U	1,300 U	1,400 U
2,4-Dinitrotoluene	480 U	430 U	480 U	430 U	480 U	410 U	480 U	500 U	450 U	410 U	400 U	380 U	390 U
2,6-Dinitrotoluene	480 U	430 U	480 U	430 U	480 U	410 U	480 U	500 U	450 U	410 U	400 U	380 U	390 U
2-Chloronaphthalene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
2-Chlorophenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	630 U	610 U	570 U	600 U
2-Methylnaphthalene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 UL	24 UL	23 UL	24 UL
2-Methylphenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	750 U	730 U	690 U	720 U
2-Nitroaniline	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	1,000 U	1,000 U	940 U	980 U
2-Nitrophenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	640 U	620 U	580 U	610 U
3- and 4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	720 U	690 U	650 U	680 U
3,3'-Dichlorobenzidine	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	440 U	420 U	400 U	420 U
3-Nitroaniline	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	1,000 U	1,000 U	940 U	980 U
4,6-Dinitro-2-methylphenol	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	1,400 U	1,300 U	1,300 U	1,300 U
4-Bromophenyl-phenylether	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
4-Chloro-3-methylphenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	630 U	610 U	570 U	600 U
4-Chloroaniline	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	450 U	440 U	410 U	430 U
4-Chlorophenyl-phenylether	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U

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Station ID	CAS004-4SD01		CAS004-4SD02		CAS004-4SD03		CAS004-4SD04			CAS04-SD01			
Sample ID	CAS004-4-SED01-00-1199	CAS004-4-SED01-01-1199	CAS004-4-SD02-00-1199	CAS004-4-SD02-01-1199	CAS004-4-SD03-00-1199	CAS004-4-SD03-01-1199	CAS004-4-SD04-00-1199	CAS004-4-SD04-00D-1199	CAS004-4-SD04-01-1199	CAS04-SD01-1209A	CAS04-SD01P-1209A	CAS04-SD01-1209B	CAS04-SD01P-1209B
Sample Date	11/12/99	11/12/99	11/14/99	11/14/99	11/13/99	11/13/99	11/13/99	11/13/99	11/13/99	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name													
4-Methylphenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	NA	NA	NA	NA
4-Nitroaniline	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	1,000 U	1,000 U	940 U	980 U
4-Nitrophenol	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	1,200 U	1,100 U	1,100 U	1,100 U
Acenaphthene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
Acenaphthylene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	680 U	660 U	620 U	640 U
Anthracene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	2.8 J	24 U	23 U	24 U
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	410 U	400 U	380 U	390 U
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	450 UJ	440 UJ	410 UJ	430 UJ
Benzo(a)anthracene	140 J	150 J	260 J	230 J	170 J	410 U	290 J	270 J	110 J	19 B	9 B	23 U	2.7 B
Benzo(a)pyrene	160 J	110 J	260 J	240 J	170 J	410 U	330 J	340 J	130 J	17 B	9 B	23 U	24 U
Benzo(b)fluoranthene	220 J	100 J	370 J	330 J	330 J	57 J	450 J	550 J	210 J	34 B	16 B	23 U	24 U
Benzo(g,h,i)perylene	56 J	600 U	130 J	100 J	84 J	410 U	1,200 U	180 J	60 J	25 UL	24 UL	23 UL	24 UL
Benzo(k)fluoranthene	120 J	86 J	290 J	280 J	170 J	410 U	420 J	440 J	130 J	12 B	6.3 B	23 U	24 U
bis(2-Chloroethoxy)methane	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
bis(2-Chloroethyl)ether	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
bis(2-Chloroisopropyl)ether	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	110 J	120 J	170 J	79 J	160 J	68 J	140 J	280 J	78 J	120 U	120 U	110 U	120 U
Butylbenzylphthalate	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	550 R	540 R	500 R	520 R
Carbazole	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	5 B	24 U	23 U	24 U
Chrysene	190 J	180 J	400 J	330 J	240 J	52 J	460 J	490 J	160 J	18 J	9.2 J	23 U	3.3 J
Dibenz(a,h)anthracene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
Dibenzofuran	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
Diethylphthalate	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
Dimethyl phthalate	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
Di-n-butylphthalate	64 J	61 J	1,200 U	62 J	81 J	410 U	1,200 U	1,600 U	84 J	120 U	120 U	110 U	120 U
Di-n-octylphthalate	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	800 U	780 U	730 U	760 U
Fluoranthene	260 J	230 J	640 J	520	410 J	87 J	600 J	580 J	250 J	42	22 J	23 U	4.7 J
Fluorene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
Hexachlorobenzene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
Hexachlorobutadiene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
Hexachlorocyclopentadiene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
Hexachloroethane	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
Indeno(1,2,3-cd)pyrene	550 U	600 U	160 J	120 J	95 J	410 U	1,200 U	210 J	64 J	9.9 B	4.9 B	23 U	24 U
Isophorone	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
Naphthalene	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	25 U	24 U	23 U	24 U
n-Nitroso-di-n-propylamine	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	410 U	400 U	380 U	390 U
n-Nitrosodiphenylamine	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	830 U	800 U	760 U	790 U
Nitrobenzene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	410 U	400 U	380 U	390 U
Pentachlorophenol	1,400 U	1,500 U	3,100 U	1,200 U	1,300 U	1,000 U	3,000 U	4,000 U	1,200 U	120 UL	120 UL	110 UL	120 UL
Phenanthrene	120 J	100 J	330 J	240 J	210 J	410 U	340 J	330 J	140 J	20 J	12 J	23 U	2.4 J
Phenol	550 U	600 U	1,200 U	470 U	530 U	410 U	1,200 U	1,600 U	490 U	590 U	570 U	540 U	560 U
Pyrene	230 J	250 J	570 J	470	350 J	84 J	610 J	590 J	250 J	38	20 J	23 U	4.6 J
Pesticide/Polychlorinated Biphenyls (UG/KG)													
4,4'-DDD	5.5 U	6 U	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	2.6 B	4.1 U	4.2 UJ	0.97 B
4,4'-DDE	5.5 U	6.6	6 UL	4.6 U	5.2 U	4.1 U	9 L	7.8 UL	4.9 UL	1.9 B	0.92 J	4.2 UJ	0.73 B
4,4'-DDT	5.5 U	6 U	6 UL	49 J	5.2 U	400 D	6 UL	7.8 UL	4.9 UL	2.7 B	2.1 J	4.2 UJ	3.9 UJ
Aldrin	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
alpha-BHC	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
alpha-Chlordane	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
Aroclor-1016	55 U	60 U	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	25 UJ	22 U	23 UJ	21 UJ
Aroclor-1221	110 U	120 U	120 UL	94 U	110 U	82 U	120 UL	160 UL	99 UL	59 UJ	52 U	53 UJ	50 UJ
Aroclor-1232	55 U	60 U	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	39 UJ	35 U	35 UJ	33 UJ
Aroclor-1242	55 U	60 U	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	25 UJ	22 U	23 UJ	21 UJ
Aroclor-1248	55 U	60 U	60 UL	33 J	52 U	41 U	19 L	78 UL	49 UL	27 UJ	24 U	24 UJ	22 UJ
Aroclor-1254	55 U	60 U	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	24 UJ	21 U	21 UJ	20 UJ
Aroclor-1260	270 K	60 U	91 L	210	52 U	170	240 L	25 JP	18 JP	30 J	25	23 UJ	7.9 J
beta-BHC	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
delta-BHC	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
Dieldrin	5.5 U	6 U	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	4.6 UJ	4.1 U	4.2 UJ	3.9 UJ
Endosulfan I	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
Endosulfan II	5.5 U	6 U	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	4.6 UJ	4.1 U	4.2 UJ	3.9 UJ
Endosulfan sulfate	5.5 U	6 U	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	4.6 UJ	4.1 U	4.2 UJ	3.9 UJ
Endrin	5.5 U	6 U	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	4.6 UJ	4.1 U	4.2 UJ	3.9 UJ
Endrin aldehyde	5.5 U	6 U	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	4.6 UJ	4.1 U	4.2 UJ	3.9 UJ
Endrin ketone	5.5 U	6 U	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	4.6 UJ	4.1 U	4.2 UJ	3.9 UJ
gamma-BHC (Lindane)	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
gamma-Chlordane	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
Heptachlor	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
Heptachlor epoxide	2.8 U	3.1 U	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.4 UJ	2.1 U	2.1 UJ	2 UJ
Methoxychlor	28 U	31 U	31 UL	24 U	27 U	21 U	31 UL	40 UL	25 UL	24 UJ	21 U	21 UJ	20 UJ
Toxaphene	280 U	310 U	310 UL	240 U	270 U	210 U	310 UL	400 UL	250 UL	46 UJ	41 U	42 UJ	39 UJ
Explosives (UG/KG)													
1,3,5-Trinitrobenzene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
1,3-Dinitrobenzene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
2,4,6-Trinitrotoluene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA

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Station ID	CAS004-4SD01		CAS004-4SD02		CAS004-4SD03		CAS004-4SD04			CAS04-SD01			
Sample ID	CAS004-4-SED01-00-1199	CAS004-4-SED01-01-1199	CAS004-4-SD02-00-1199	CAS004-4-SD02-01-1199	CAS004-4-SD03-00-1199	CAS004-4-SD03-01-1199	CAS004-4-SD04-00-1199	CAS004-4-SD04-00D-1199	CAS004-4-SD04-01-1199	CAS04-SD01-1209A	CAS04-SD01P-1209A	CAS04-SD01-1209B	CAS04-SD01P-1209B
Sample Date	11/12/99	11/12/99	11/14/99	11/14/99	11/13/99	11/13/99	11/13/99	11/13/99	11/13/99	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name													
2-Amino-4,6-dinitrotoluene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
2-Nitrotoluene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
3-Nitrotoluene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
4-Nitrotoluene	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
HMX	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
RDX	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
Tetryl	480 U	430 U	480 U	430 U	480 U	450 U	480 U	500 U	450 U	NA	NA	NA	NA
Total Metals (MG/KG)													
Aluminum	8,340 L	5,120 L	6,070 L	2,780 L	5,950 L	1,500 L	4,210 L	4,070 L	3,370 L	5,440	5,150	25,700	14,000
Antimony	1.7 B	1 J	0.67 U	0.48 U	0.62 U	0.43 U	0.65 U	0.65 U	0.55 U	0.83 UL	0.72 UL	0.56 L	0.83 UL
Arsenic	12.2 L	11.2	4.5	1.9 J	3.2	0.98 J	8.8	7.2	9.5	3.5 K	2.7 K	14.6 K	7.9 K
Barium	71.7 J	39.2 J	27.1 J	9.9 B	24.9 J	6.4 B	27.5 J	23.6 J	19.2 J	11.7	9.9	24.1	17.6
Beryllium	0.73 B	0.49 B	0.56 J	0.27 J	0.6 J	0.21 J	0.36 J	0.22 J	0.31 J	0.25 J	0.22 J	0.87	0.51 J
Cadmium	5.7	7.2	3.2	0.15 J	2.9	0.85 J	0.79 J	0.52 J	0.09 J	0.11	0.07 J	0.14	0.12
Calcium	25,200	7,010	4,550 J	1,670 J	3,380 J	1,360 J	4,310 J	3,400 J	15,200 J	704	601	5,970 J	1,820 J
Chromium	35.8	25	17.9	9.3	17.2	7.7	9.5	7.7	7	11.1 K	9.8 K	49 K	26.4 K
Cobalt	4.6 J	3.1 J	3.9 J	1.3 U	2.9 J	1.2 U	1.8 U	1.8 U	1.5 U	0.97 J	0.83 J	4.1 J	2.1 J
Copper	30.7	10.1	62.7 J	3.8 B	65.3 J	7.3 B	33.5 J	21.2 J	5.1 B	3.3	2.6	4.4	3.7
Cyanide	0.04 UL	0.04 UL	0.04 UL	0.03 UL	0.03 UL	0.02 UL	0.04 UL	0.04 UL	0.03 UL	0.91 U	0.84 U	0.84 U	0.77 U
Iron	15,400	9,040	14,300 L	7,840 L	14,100	4,540 L	9,410 L	8,490 L	4,950 L	7,430 J	6,370 J	32,900 J	17,800 J
Lead	52.3	59.8	24.6	4.2	20.3	5.4	20.6	16	10.9	9.2	6.8	11.2	6.8
Magnesium	2,790	2,000	1,730	859 J	1,780	597 J	1,070 J	912 J	410 J	626 K	563 K	2,730 K	1,390 K
Manganese	62	26.8	93.4	14.5	74.9	12.1	72.7	60	36	14.8 J	14.2 J	27.4 J	17.6 J
Mercury	0.07 J	0.04 U	0.04 UL	0.02 UL	0.03 UL	0.03 UL	0.04 UL	0.04 L	0.03 UL	0.02 J	0.02 J	0.02 J	0.01 J
Nickel	23.6	18.3	7.9 J	1.7 J	7.3 J	2 J	5 J	4.5 J	2.3 J	2.2 J	2.1 J	10.2	5.4
Potassium	1,210 J	673 J	1,290 J	1,440	1,550	911 J	352 B	368 B	272 B	637 K	598 K	2,630 K	1,410 K
Selenium	1.1 U	1 U	0.91 U	0.65 U	0.84 U	0.59 U	0.89 U	0.88 U	0.75 U	0.44 B	0.36 B	0.59 B	0.38 B
Silver	5.6 B	2.1 B	5.1 B	2.3 B	3.9 B	1.5 B	2.8 B	2 B	0.97 U	0.16 J	0.16 J	2.1 U	0.14 J
Sodium	191 B	65.2 B	118 B	57 J	101 B	59.2 B	73.6 B	80.3 B	64.3 B	23.4 B	22.3 B	100 B	63.4 B
Thallium	0.91 UL	0.81 UL	0.73 UL	0.52 UL	0.67 UL	0.47 UL	0.71 UL	0.71 UL	0.6 UL	1.6 U	1.3 U	0.52 J	1.6 U
Vanadium	36.6	25.4	21.9	9.6 J	21.1	6.8 J	15.1	13.2 J	9.8 J	14.6 K	12.8 K	64.3 K	34.2 K
Zinc	147	87.6 B	145	30.2 B	130	44.4 B	228	180	307	11.8 K	9.7 K	27.7 K	17.1 K
Acid Volatile Sulfide/Simultaneously Extractable Metals (UMOL/G)													
Zinc, SEM	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0058 K	NA	0.0095 B	NA
Acid volatile sulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.14 U	NA	0.13 U	NA
Cadmium, SEM	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.00E-04 J	NA	0.0013 J	NA
Copper, SEM	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0076 L	NA	0.0126 L	NA
Lead, SEM	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00611 J	NA	0.00726 J	NA
Mercury, SEM	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.80E-05 J	NA	6.30E-05 R	NA
Nickel, SEM	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0029 B	NA	0.0018 B	NA
Silver, SEM	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0037 UL	NA	0.0035 UL	NA
Wet Chemistry													
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.3	6.9	7.5	7.6
Total organic carbon (TOC) (UG/G)	NA	NA	NA	NA	NA	NA	NA	NA	NA	25,000	17,000	9,500	17,000

Notes:

Shading indicates detections

NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
D - Compound identified in an analysis at a secondary dilution factor
J - Analyte present, value may or may not be accurate or precise
JP - Analyte present, Difference between the concentration on the two columns is greater than 20%
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

Station ID	CAS04-SD02		CAS04-SD03		CAS04-SD04		CAS04-SD05		CAS04-SD06		CAS04-SD07			
Sample ID	CAS04-SD02-1209A	CAS04-SD02-1209B	CAS04-SD03-1209A	CAS04-SD03-1209B	CAS04-SD04-1209A	CAS04-SD04-1209B	CAS04-SD05-1209A	CAS04-SD05-1209B	CAS04-SD06-1209A	CAS04-SD06-1209B	CAS04-SD07-1209A	CAS04-SD07P-1209A	CAS04-SD07-1209B	CAS04-SD07P-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name														
Volatile Organic Compounds (UG/KG)														
1,1,1-Trichloroethane	10 UJ	8 UJ	9 UJ	8 U	7 UJ	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	7 U	8 U	8 U	7 U
1,1,2,2-Tetrachloroethane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 R	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	10 UJ	8 UJ	9 UJ	8 U	7 UJ	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	7 U	8 U	8 U	7 U
1,1,2-Trichloroethane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,1-Dichloroethane	10 UJ	8 UJ	9 UJ	8 UJ	7 UJ	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	7 U	8 U	8 U	7 U
1,1-Dichloroethene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,2,4-Trichlorobenzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 R	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,2-Dibromo-3-chloropropane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 R	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,2-Dibromoethane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,2-Dichlorobenzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	2 J	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,2-Dichloroethane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,2-Dichloroethene (total)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,3-Dichlorobenzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 R	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
1,4-Dichlorobenzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 J	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
2-Butanone	42 UJ	32 UJ	37 UJ	31 U	21 J	9 J	51 J	14 J	25 J	26 J	29 U	33 U	32 U	30 U
2-Hexanone	42 UJ	32 UJ	37 UJ	31 U	28 UJ	33 UJ	44 UJ	36 UJ	35 UJ	36 UJ	29 U	33 U	32 U	30 U
4-Methyl-2-pentanone	42 UJ	32 UJ	37 UJ	31 U	28 UJ	33 UJ	44 UJ	36 UJ	35 UJ	36 UJ	29 U	33 U	32 U	30 U
Acetone	34 B	21 B	13 B	11 B	100 J	64 B	230 J	87 J	120 J	130 J	24 B	34 B	22 B	19 B
Benzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Bromodichloromethane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Bromoform	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Bromomethane	17 UJ	13 UJ	15 UJ	12 U	11 UJ	13 UJ	17 UJ	14 UJ	14 UJ	14 UJ	12 U	13 U	13 U	12 U
Carbon disulfide	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	2 J	7 UJ	7 UJ	1 J	6 U	6 U	6 U	6 U
Carbon tetrachloride	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Chlorobenzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Chloroethane	17 UJ	13 UJ	15 UJ	12 U	11 UJ	13 UJ	17 UJ	14 UJ	14 UJ	14 UJ	12 U	13 U	13 U	12 U
Chloroform	10 UJ	8 UJ	9 UJ	8 U	7 UJ	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	7 U	8 U	8 U	7 U
Chloromethane	17 UJ	13 UJ	15 UJ	12 U	11 UJ	13 UJ	17 UJ	14 UJ	14 UJ	14 UJ	12 U	13 U	13 U	12 U
cis-1,2-Dichloroethene	10 UJ	8 UJ	9 UJ	8 U	7 UJ	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	7 U	8 U	8 U	7 U
cis-1,3-Dichloropropene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Cyclohexane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Dibromochloromethane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Dichlorodifluoromethane (Freon-12)	17 UJ	13 UJ	15 UJ	12 U	11 UJ	13 UJ	17 UJ	14 UJ	14 UJ	14 UJ	12 U	13 U	13 U	12 U
Ethylbenzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Isopropylbenzene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 R	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
m- and p-Xylene	19 UJ	14 UJ	16 UJ	14 U	12 UJ	14 UJ	19 UJ	16 UJ	15 UJ	16 UJ	13 U	14 U	14 U	13 U
Methyl acetate	15 UJ	12 UJ	13 UJ	11 U	10 R	12 UJ	16 UJ	13 UJ	12 UJ	13 UJ	10 U	12 U	12 U	11 U
Methylcyclohexane	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Methylene chloride	42 UJ	32 UJ	37 UJ	31 U	28 UJ	33 UJ	44 UJ	36 UJ	35 UJ	36 UJ	29 U	33 U	32 U	30 U
Methyl-tert-butyl ether (MTBE)	15 UJ	12 UJ	13 UJ	11 U	10 UJ	12 UJ	16 UJ	13 UJ	12 UJ	13 UJ	10 U	12 U	12 U	11 U
o-Xylene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Styrene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
Tetrachloroethene	8 J	13 J	28 J	9	42 J	16 J	14 J	16 J	8 J	17 J	6 U	5 J	6 U	2 J
Toluene	8 UJ	6 UJ	7 UJ	6 U	6 UJ	6 UJ	9 UJ	7 UJ	7 UJ	7 UJ	6 U	6 U	6 U	6 U
trans-1,2-Dichloroethene	12 UJ	9 UJ	10 UJ	9 U	8 UJ	9 UJ	12 UJ	10 UJ	10 UJ	10 UJ	8 U	9 U	9 U	8 U
trans-1,3-Dichloropropene	12 UJ	9 UJ	10 UJ	9 U	8 UJ	9 UJ	12 UJ	10 UJ	10 UJ	10 UJ	8 U	9 U	9 U	8 U
Trichloroethene	10 UJ	8 UJ	9 UJ	8 U	7 UJ	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	7 U	8 U	8 U	7 U
Trichlorofluoromethane(Freon-11)	17 UJ	13 UJ	15 UJ	12 U	11 UJ	13 UJ	17 UJ	14 UJ	14 UJ	14 UJ	12 U	13 U	13 U	12 U
Vinyl chloride	17 UJ	13 UJ	15 UJ	12 U	11 UJ	13 UJ	17 UJ	14 UJ	14 UJ	14 UJ	12 U	13 U	13 U	12 U
Xylene, total	26 UJ	20 UJ	22 UJ	19 U	16 UJ	20 UJ	26 UJ	21 UJ	21 UJ	21 UJ	17 U	20 U	19 U	18 U
Semivolatile Organic Compounds (UG/KG)														
1,1-Biphenyl	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
1,2,4,5-Tetrachlorobenzene	710 U	590 U	620 U	520 U	530 U	480 U	750 U	640 U	600 U	630 U	530 U	570 U	530 U	540 U
2,2'-Oxybis(1-chloropropane)	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
2,4,5-Trichlorophenol	1,400 U	1,200 U	1,200 U	1,000 U	1,000 U	940 U	1,500 U	1,200 U	1,200 U	1,200 U	1,000 U	1,100 U	1,000 U	1,000 U
2,4,6-Trichlorophenol	810 U	670 U	710 U	590 U	610 U	550 U	860 U	730 U	690 U	720 U	610 U	660 U	610 U	620 U
2,4-Dichlorophenol	760 U	630 U	670 U	560 U	570 U	520 U	800 U	680 U	640 U	680 U	570 U	620 U	570 U	580 U
2,4-Dimethylphenol	840 U	700 U	740 U	620 U	640 U	570 U	890 U	760 U	720 U	760 U	630 U	680 U	630 U	640 U
2,4-Dinitrophenol	1,900 U	1,600 U	1,700 U	1,400 U	1,400 U	1,300 U	2,000 U	1,700 U	1,600 U	1,700 U	1,400 U	1,600 U	1,400 U	1,500 U
2,4-Dinitrotoluene	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
2,6-Dinitrotoluene	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
2-Chloronaphthalene	34 U	28 U	30 U	25 U	25 U	23 U	36 U	30 U	29 U	30 U	25 U	27 U	25 U	26 U
2-Chlorophenol	840 U	700 U	740 U	620 U	640 U	570 U	890 U	760 U	720 U	760 U	630 U	680 U	630 U	640 U
2-Methylnaphthalene	34 UL	28 UL	4 L	25 UL	25 UL	23 UL	36 U	30 U	29 U	30 U	25 U	27 U	25 U	26 U
2-Methylphenol	1,000 U	840 U	890 U	740 U	760 U	690 U	1,100 U	910 U	860 U	910 U	760 U	820 U	760 U	770 U
2-Nitroaniline	1,400 U	1,200 U	1,200 U	1,000 U	1,000 U	940 U	1,500 U	1,200 U	1,200 U	1,200 U	1,000 U	1,100 U	1,000 U	1,000 U
2-Nitrophenol	860 U	720 U	760 U	630 U	650 U	580 U	910 U	770 U	730 U	770 U	650 U	700 U	640 U	660 U
3- and 4-Methylphenol	960 U	800 U	840 U	700 U	720 U	650 U	1,000 U	860 U	820 U	860 U	720 U	780 U	720 U	730 U
3,3'-Dichlorobenzidine	590 U	490 U	520 U	430 U	440 U	400 R	630 U	530 U	500 U	530 U	440 U	480 U	440 U	450 U
3-Nitroaniline	1,400 U	1,200 U	1,200 U	1,000 U	1,000 U	940 U	1,500 U	1,200 U	1,200 U	1,200 U	1,000 U	1,100 U	1,000 U	1,000 U
4,6-Dinitro-2-methylphenol	1,800 U	1,500 U	1,600 U	1,400 U	1,400 U	1,300 U	2,000 U	1,700 U	1,600 U	1,700 U	1,400 U	1,500 U	1,400 U	1,400 U
4-Bromophenyl-phenylether	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
4-Chloro-3-methylphenol	840 U	700 U	740 U	620 U	640 U	570 U	890 U	760 U	720 U	760 U	630 U	680 U	630 U	640 U
4-Chloroaniline	600 U	500 U	530 U	440 U	460 R	410 U	640 U	540 U	520 U	540 U	460 U	490 U	460 U	460 U
4-Chlorophenyl-phenylether	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U

Station ID	CAS04-SD02		CAS04-SD03		CAS04-SD04		CAS04-SD05		CAS04-SD06		CAS04-SD07			
Sample ID	CAS04-SD02-1209A	CAS04-SD02-1209B	CAS04-SD03-1209A	CAS04-SD03-1209B	CAS04-SD04-1209A	CAS04-SD04-1209B	CAS04-SD05-1209A	CAS04-SD05-1209B	CAS04-SD06-1209A	CAS04-SD06-1209B	CAS04-SD07-1209A	CAS04-SD07P-1209A	CAS04-SD07-1209B	CAS04-SD07P-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name														
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	1,400 U	1,200 U	1,200 U	1,000 U	1,000 U	940 U	1,500 U	1,200 U	1,200 U	1,200 U	1,000 U	1,100 U	1,000 U	1,000 U
4-Nitrophenol	1,600 U	1,300 U	1,400 U	1,200 U	1,200 U	1,100 U	1,700 U	1,400 U	1,300 U	1,400 U	1,200 U	1,300 U	1,200 U	1,200 U
Acenaphthene	2.9 J	28 U	4.3 J	2.6 J	7.9 J	23 U	12 J	3.5 J	29 U	30 U	25 U	27 U	25 U	26 U
Acenaphthylene	2.3 J	28 U	120	15 J	83 K	8.9 J	30 J	10 J	29 U	30 U	25 U	27 U	25 U	26 U
Acetophenone	910 U	760 U	800 U	670 U	690 U	620 UL	970 UL	820 UL	770 UL	820 UL	680 UL	740 UL	680 UL	690 UL
Anthracene	5.6 J	2.3 J	260	30	75 K	8.3 J	55	11 J	29 U	30 U	25 U	27 U	25 U	26 U
Atrazine	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Benzaldehyde	600 UJ	500 UJ	530 UJ	440 UJ	460 UJ	410 UJ	640 U	540 U	520 U	540 U	460 U	490 U	460 U	460 U
Benzo(a)anthracene	35 B	12 B	1,300	180	1,500	120 L	420	130	28 B	21 B	7.3 B	7.4 B	25 U	26 U
Benzo(a)pyrene	36	12 B	2,100	220	1,500	100 L	380	130	18 J	9.7 J	25 U	27 U	25 U	26 U
Benzo(b)fluoranthene	76	26 B	3,900	510	3,300	23 U	690	220	40 B	30 B	25 U	27 U	25 U	26 U
Benzo(g,h,i)perylene	7.1 B	28 UL	1,900 L	93 L	490 J	23 UL	130 L	56 L	10 L	30 UL	25 UL	27 UL	25 UL	26 UL
Benzo(k)fluoranthene	24 J	9.9 B	1,600	140	1,100	23 U	150	46	11 J	5.6 J	25 U	27 U	25 U	26 U
bis(2-Chloroethoxy)methane	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
bis(2-Chloroethyl)ether	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	170 U	140 U	120 J	59 J	130 U	110 U	180 U	100 J	140 U	150 U	130 U	140 U	130 U	130 U
Butylbenzylphthalate	550 U	460 U	490 U	140 J	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Caprolactam	740 R	620 R	650 R	540 R	560 R	500 R	790 R	670 R	630 R	660 R	560 R	600 R	560 R	560 R
Carbazole	8.6 B	2.4 B	31	7.6 B	49 K	23 U	23 J	9.6 J	7.2 J	7.5 J	6 J	27 U	25 U	26 U
Chrysene	35	13 J	2,700	310	1,900	100 L	440	130	17 J	5.5 J	25 U	27 U	25 U	26 U
Dibenz(a,h)anthracene	34 U	28 U	660	84	320 K	23 U	120	48	16 J	12 J	25 U	27 U	25 U	26 U
Dibenzofuran	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Diethylphthalate	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Dimethyl phthalate	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Di-n-butylphthalate	170 U	140 U	72 J	110 J	130 U	110 U	180 U	150 U	140 U	150 U	130 U	140 U	130 U	130 U
Di-n-octylphthalate	1,100 U	900 U	950 U	790 U	820 U	740 U	1,100 U	970 U	920 U	970 U	810 U	880 U	810 U	820 U
Fluoranthene	72	30	320	140	1,800	170 L	820	250	41	23 J	25 U	27 U	25 U	26 U
Fluorene	34 U	28 U	14 B	25 U	12 B	23 U	30 J	8.3 B	29 U	30 U	25 U	27 U	25 U	26 U
Hexachlorobenzene	34 U	28 U	30 U	25 U	25 U	23 U	36 U	30 U	29 U	30 U	25 U	27 U	25 U	26 U
Hexachlorobutadiene	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Hexachlorocyclopentadiene	550 U	460 U	490 U	410 U	420 UL	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Hexachloroethane	34 U	28 U	30 U	25 U	25 UL	23 U	36 U	30 U	29 U	30 U	25 U	27 U	25 U	26 U
Indeno(1,2,3-cd)pyrene	23 B	7.1 B	2,800	370	1,500	71	300	110	23 J	14 J	25 U	27 U	25 U	26 U
Isophorone	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Naphthalene	34 U	28 U	6.6 J	25 U	25 U	23 U	6 J	30 U	29 U	30 U	25 U	27 U	25 U	26 U
n-Nitroso-di-n-propylamine	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
n-Nitrosodiphenylamine	1,100 U	920 U	980 U	820 U	840 U	760 U	1,200 UL	1,000 UL	950 UL	1,000 UL	840 UL	900 UL	840 UL	850 UL
Nitrobenzene	550 U	460 U	490 U	410 U	420 U	380 U	590 U	500 U	470 U	500 U	420 U	450 U	420 U	420 U
Pentachlorophenol	170 UL	140 UL	150 UL	120 UL	24 L	110 UL	180 UL	150 UL	140 UL	150 UL	130 UL	140 UL	130 UL	130 UL
Phenanthrene	39	14 J	98	38	200 K	11 J	340	100	13 J	7.5 J	25 U	27 U	25 U	26 U
Phenol	790 U	660 U	700 U	580 U	600 U	540 U	840 U	710 U	670 U	710 U	600 U	640 U	600 U	600 U
Pyrene	64	26 J	1,100	300	3,800	180 L	690	190	27 J	16 J	25 U	27 U	25 U	26 U
Pesticide/Polychlorinated Biphenyls (UG/KG)														
4,4'-DDD	5.6 U	4.7 UJ	380 J	260 J	310	22 J	34 J	8.4 J	4.5 J	5 UJ	1.6 J	4.3 UJ	4.3 U	4.1 UJ
4,4'-DDE	1.8 J	0.97 B	600 J	270 J	160 L	4.4 J	9.1 J	3.3 J	1.4 J	5 UJ	4.1 U	4.3 UJ	4.3 U	4.1 UJ
4,4'-DDT	5.6 U	4.7 UJ	1,600 J	740 J	55 J	2.5 B	37 J	8.2 J	4.3 J	5 UJ	4.1 U	0.83 J	4.3 U	4.1 UJ
Aldrin	2.9 U	2.4 UJ	2.7 UL	2.2 UJ	2.2 UJ	2 UJ	3 UJ	2.5 UJ	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
alpha-BHC	2.9 U	2.4 UJ	2.7 UL	2.2 UJ	2.2 UJ	2 UJ	3 UJ	2.5 UJ	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
alpha-Chlordane	2.9 U	2.4 UJ	17 J	6 J	2.2 UJ	2 UJ	3 UJ	2.5 UJ	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
Aroclor-1016	31 U	25 UJ	280 U	120 UJ	24 U	22 UL	32 U	26 U	25 U	28 U	22 U	24 U	23 U	22 U
Aroclor-1221	72 U	59 UJ	660 U	270 UJ	55 U	51 UL	75 U	61 U	58 U	64 U	52 U	55 U	55 U	52 U
Aroclor-1232	48 U	40 UJ	440 U	180 UJ	37 U	34 UL	50 U	41 U	39 U	43 U	35 U	37 U	36 U	34 U
Aroclor-1242	31 U	25 UJ	280 U	120 UJ	24 U	22 UL	32 U	26 U	52 J	28 U	22 U	24 U	23 U	22 U
Aroclor-1248	32 U	27 UJ	300 U	120 UJ	25 U	23 UL	34 U	28 U	26 U	29 U	24 U	25 U	25 U	23 U
Aroclor-1254	29 U	24 UJ	21,000	8,900 J	22 U	20 UL	330	63	24 U	26 U	21 U	22 U	22 U	21 U
Aroclor-1260	200	39 J	280 U	120 UJ	50 K	25 L	320	72	44	28 U	23	24 U	23 U	22 U
beta-BHC	2.9 U	2.4 UJ	2.7 UL	2.2 UJ	2.2 UJ	2 UJ	3 UJ	2.5 UJ	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
delta-BHC	2.9 U	2.4 UJ	2.7 UL	2.2 UJ	2.2 UJ	2 UJ	3 UJ	2.5 UJ	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
Dieldrin	1.8 J	4.7 UJ	1,400 J	600 J	47 K	3.4 J	5.9 UJ	4.8 UJ	4.6 UJ	5 UJ	4.1 U	4.3 UJ	4.3 U	4.1 UJ
Endosulfan I	1.7 J	2.4 UJ	58 L	23 J	2.2 UJ	2 UJ	9.4 J	2.7 J	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
Endosulfan II	5.6 U	4.7 UJ	830 J	360 J	4.3 UJ	0.86 J	9.4 J	2.2 J	1.1 J	5 UJ	0.64 J	4.3 UJ	4.3 U	4.1 UJ
Endosulfan sulfate	5.6 U	4.7 UJ	5.2 UL	4.3 UJ	4.3 UJ	3.2 J	5.9 UJ	4.8 UJ	3.4 J	5 UJ	4.1 U	4.3 UJ	4.3 U	4.1 UJ
Endrin	9.6	43 J	1,200	520	4.3 UJ	4 UJ	5.9 UJ	4.8 UJ	4.6 UJ	5 UJ	4.1 U	4.3 UJ	4.3 U	4.1 UJ
Endrin aldehyde	5.6 U	4.7 UJ	290 J	140 J	4.3 UJ	4 UJ	13 J	3.6 J	4.6 UJ	5 UJ	4.1 U	4.3 UJ	4.3 U	4.1 UJ
Endrin ketone	5.6 U	4.7 UJ	5.2 UL	140 J	4.3 UJ	4 UJ	5.9 UJ	4.8 UJ	4.6 UJ	5 UJ	4.1 U	4.3 UJ	4.3 U	4.1 UJ
gamma-BHC (Lindane)	2.9 U	2.4 UJ	2.7 UL	2.2 UJ	2.2 UJ	2 UJ	3 UJ	2.5 UJ	0.78 J	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
gamma-Chlordane	2 J	2.4 UJ	780 J	340 J	14 L	0.75 J	12 J	2.8 J	1.6 J	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
Heptachlor	2.9 U	2.4 UJ	2.7 UL	2.2 UJ	2.2 UJ	2 UJ	1.7 J	2.5 UJ	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
Heptachlor epoxide	2.9 U	2.4 UJ	540 J	230 J	2.2 UJ	2 UJ	3 UJ	2.5 UJ	2.4 UJ	2.6 UJ	2.1 U	2.2 UJ	2.2 U	2.1 UJ
Methoxychlor	29 U	24 UJ	520 J	230 J	22 UJ	20 UJ	30 UJ	25 UJ	24 UJ	26 UJ	21 U	22 UJ	22 U	21 UJ
Toxaphene	56 U	47 UJ	52 UL	43 UJ	43 UJ	40 UJ	59 UJ	48 UJ	46 UJ	50 UJ	41 U	43 UJ	43 U	41 UJ
Explosives (UG/KG)														
1,3,5-Trinitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Station ID	CAS04-SD02		CAS04-SD03		CAS04-SD04		CAS04-SD05		CAS04-SD06		CAS04-SD07			
Sample ID	CAS04-SD02-1209A	CAS04-SD02-1209B	CAS04-SD03-1209A	CAS04-SD03-1209B	CAS04-SD04-1209A	CAS04-SD04-1209B	CAS04-SD05-1209A	CAS04-SD05-1209B	CAS04-SD06-1209A	CAS04-SD06-1209B	CAS04-SD07-1209A	CAS04-SD07P-1209A	CAS04-SD07-1209B	CAS04-SD07P-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name														
2-Amino-4,6-dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HMX	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)														
Aluminum	5,560	4,810	20,400	16,700	11,800	7,840	10,100	11,300	5,510	5,830	11,400	11,600	28,700 J	9,020 J
Antimony	1.3 UL	0.91 UL	2 L	1.2 L	0.83 UL	0.1 L	1.1 UL	1 UL	0.8 UL	0.89 UL	0.29 B	0.92 UL	0.81 B	0.66 B
Arsenic	3.5 K	2.3 K	8.6 K	7.4 K	4.5 K	2.2 K	4.9 L	4.2 L	2.5 L	2.3 L	3.3 L	3.6 L	9 L	3.4 L
Barium	25.3	12.5	80.8	63.2	166	132	31.6	29.8	17.1	19.6	27.7	26.9	68.4 J	21.8 J
Beryllium	0.28 J	0.22 J	0.78	0.76	0.49 J	0.5	0.57 J	0.57 J	0.34 J	0.35 J	0.65	0.64	1.8 J	0.6 J
Cadmium	0.39	0.11	4.7	3.1	0.24	0.07 J	0.32	0.25	0.17	0.07 J	0.44	0.36	1.4 J	0.34 J
Calcium	12,300	2,920	9,290	6,900	2,130	1,000	11,500	7,550	9,290	4,950	2,250	2,300	4,670	1,720
Chromium	9.6 K	8.1 K	49.7 K	37.8 K	17 K	8.2 K	18.5 L	19.8 L	10.5 L	10.6 L	27.2 L	25.9 L	71.8 L	25.5 L
Cobalt	1.2 J	0.76 J	5.1 J	4.1 J	2.5 J	1.6 J	2.7 J	2.7 J	1.3 J	1.2 J	2.7	2.6 J	6.8 J	1.9 J
Copper	11.1	2.8	142	63.9	6.9	3.8	7.5 J	5.9 J	3.7 J	2.5 J	2.5 J	3.5 J	3 J	2.9 J
Cyanide	1.3 U	0.98 U	0.98 U	0.84 U	0.91 U	0.84 U	1.3 U	1.1 U	0.91 U	1 U	0.77 U	0.91 U	0.84 U	0.84 U
Iron	7,030 J	5,200 J	25,900 J	23,200 J	12,600 J	5,260 J	13,200	12,300	6,690	5,740	11,800	12,000	28,200 J	8,850 J
Lead	17.2	9.2	417	235	200	136	17.5	13.2	5.7	4.6	5.7	5.6	14.3	4.8
Magnesium	652 K	434 K	2,010 K	1,860 K	909 K	584 K	1,350	1,330	1,010	775	1,630	1,640	4,050	1,360
Manganese	43.2 J	13.1 J	140 J	92.4 J	101 J	40.1 J	47.4	34.4	20.2	15.9	16.5	20.2	50.4	17.2
Mercury	0.05 J	0.03 J	0.62	0.18	0.01 J	0.01 J	0.12	0.05	0.02 J	0.01 J	0.02 J	0.02 J	0.04 J	0.01 J
Nickel	3.5 J	1.9 J	16.6	22.9	4.4	3.3 J	6.5	6.3	2.9 J	2.7 J	7	7.4	20.9	7.2
Potassium	504 K	346 K	1,580 K	1,390 K	771 K	450 K	1,640 K	1,650 K	1,060 K	1,030 K	1,830 K	1,940 K	4,710 K	1,610 K
Selenium	0.67 B	0.35 B	0.57 B	0.98 U	0.31 B	0.85 U	0.87 J	0.4 J	0.37 J	1.1 U	0.3 J	0.33 J	2.2 U	1.1 U
Silver	0.18 J	1.7 U	6.1	3.1	0.14 J	0.07 J	0.18 B	0.14 B	1.5 U	1.7 U	1.1 U	0.08 B	3.4 U	1.6 U
Sodium	57.9 B	27.2 B	186 B	162 B	40.9 B	27.2 B	48.1 B	48 B	106 B	33.2 B	29.2 B	26.8 B	75.5 B	30.6 B
Thallium	2.5 U	1.7 U	1.7 U	1.5 U	0.15 J	1.3 U	2 U	1.9 U	1.5 U	1.7 U	1.1 U	1.7 U	3.4 U	1.6 U
Vanadium	14.7 K	11.4 K	37.6 K	35.5 K	24.2 K	10.6 K	23	24.4	12.2	12.1	30.4	30.6	82	29
Zinc	32.1 K	13.5 K	475 K	325 K	56.2 K	21.2 K	53.2	40.9	20.1	11.1	19.7	21.2	54.1 J	17.4 J
Acid Volatile Sulfide/Simultaneously Extractable Metals (UMOL/G)														
Zinc, SEM	0.197 K	0.0256 K	1.16 K	0.608 K	0.202 K	0.0557 K	NA	NA	NA	NA	NA	NA	NA	NA
Acid volatile sulfide	0.18 U	0.14 U	0.16 U	0.13 U	0.18	0.12 U	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, SEM	0.0032	6.30E-04 J	0.00948	0.00571	1.40E-04 J	1.70E-04 J	NA	NA	NA	NA	NA	NA	NA	NA
Copper, SEM	0.136 L	0.011 L	0.343 L	0.218 L	0.0431 L	0.0049 L	NA	NA	NA	NA	NA	NA	NA	NA
Lead, SEM	0.0611 J	0.0131 J	0.303 J	0.302 J	0.276 J	0.14 J	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, SEM	8.80E-05 R	7.10E-05 R	7.20E-05 J	1.96E-04 J	6.60E-05 R	6.10E-05 R	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, SEM	0.022 J	0.003 B	0.035	0.011 B	0.0058 B	0.0012 B	NA	NA	NA	NA	NA	NA	NA	NA
Silver, SEM	4.90E-04 J	0.004 UL	0.00624 J	0.00398 J	0.0037 UL	0.0034 UL	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry														
pH	7.7	7.8	7.6	8.2	7.1	7	7.4	7.8	8	7.9	8.2	NA	8	NA
Total organic carbon (TOC) (UG/G)	62,000	28,000	40,000	19,000	16,000	22,000	36,000	14,000	19,000	34,000	2,300	NA	2,400	NA

Notes:

Shading indicates detections

NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
D - Compound identified in an analysis at a secondary dilution factor
J - Analyte present, value may or may not be accurate or precise
JP - Analyte present, Difference between the concentration on the two columns is greater than 20%
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

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Station ID	CAS04-SD08		CAS04-SD09	
Sample ID	CAS04-SD08-1209A	CAS04-SD08-1209B	CAS04-SD09-1209A	CAS04-SD09-1209B
Sample Date	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name				
Volatile Organic Compounds (UG/KG)				
1,1,1-Trichloroethane	8 UJ	7 U	9 UJ	8 U
1,1,2,2-Tetrachloroethane	7 UJ	6 U	8 UJ	7 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	8 UJ	7 U	9 UJ	8 U
1,1,2-Trichloroethane	7 UJ	6 U	8 UJ	7 U
1,1-Dichloroethane	8 UJ	7 U	9 UJ	8 U
1,1-Dichloroethene	7 UJ	6 U	8 UJ	7 U
1,2,4-Trichlorobenzene	7 UJ	6 U	8 UJ	7 U
1,2-Dibromo-3-chloropropane	7 UJ	6 U	8 UJ	7 U
1,2-Dibromoethane	7 UJ	6 U	8 UJ	7 U
1,2-Dichlorobenzene	7 UJ	6 U	8 UJ	7 U
1,2-Dichloroethane	7 UJ	6 U	8 UJ	7 U
1,2-Dichloroethene (total)	NA	NA	NA	NA
1,2-Dichloropropane	7 UJ	6 U	8 UJ	7 U
1,3-Dichlorobenzene	7 UJ	6 U	8 UJ	7 U
1,4-Dichlorobenzene	7 UJ	6 U	8 UJ	7 U
2-Butanone	34 UJ	28 U	44 J	18 J
2-Hexanone	34 UJ	28 U	39 UJ	34 U
4-Methyl-2-pentanone	34 UJ	28 U	39 UJ	34 U
Acetone	42 B	8 B	170 J	110 K
Benzene	7 UJ	6 U	8 UJ	7 U
Bromodichloromethane	7 UJ	6 U	8 UJ	7 U
Bromoform	7 UJ	6 U	8 UJ	7 U
Bromomethane	14 UJ	11 U	16 UJ	14 U
Carbon disulfide	7 UJ	6 U	8 UJ	7 U
Carbon tetrachloride	7 UJ	6 U	8 UJ	7 U
Chlorobenzene	7 UJ	6 U	8 UJ	7 U
Chloroethane	14 UJ	11 U	16 UJ	14 U
Chloroform	8 UJ	7 U	9 UJ	8 U
Chloromethane	14 UJ	11 U	16 UJ	14 U
cis-1,2-Dichloroethene	8 UJ	7 U	9 UJ	8 U
cis-1,3-Dichloropropene	7 UJ	6 U	8 UJ	7 U
Cyclohexane	7 UJ	6 U	8 UJ	7 U
Dibromochloromethane	7 UJ	6 U	8 UJ	7 U
Dichlorodifluoromethane (Freon-12)	14 UJ	11 U	16 UJ	14 U
Ethylbenzene	7 UJ	6 U	8 UJ	7 U
Isopropylbenzene	7 UJ	6 U	8 UJ	7 U
m- and p-Xylene	15 UJ	12 U	17 UJ	15 U
Methyl acetate	12 UJ	10 U	14 UJ	12 U
Methylcyclohexane	7 UJ	6 U	8 UJ	7 U
Methylene chloride	34 UJ	28 U	39 UJ	34 U
Methyl-tert-butyl ether (MTBE)	12 UJ	10 U	14 UJ	12 U
o-Xylene	7 UJ	6 U	8 UJ	7 U
Styrene	7 UJ	6 U	8 UJ	7 U
Tetrachloroethene	4 J	2 J	15 J	7 U
Toluene	7 UJ	6 U	8 UJ	7 U
trans-1,2-Dichloroethene	10 UJ	8 U	11 UJ	10 U
trans-1,3-Dichloropropene	10 UJ	8 U	11 UJ	10 U
Trichloroethene	8 UJ	7 U	9 UJ	8 U
Trichlorofluoromethane(Freon-11)	14 UJ	11 U	16 UJ	14 U
Vinyl chloride	14 UJ	11 U	16 UJ	14 U
Xylene, total	20 UJ	17 U	24 UJ	21 U
Semivolatile Organic Compounds (UG/KG)				
1,1-Biphenyl	440 U	400 U	530 U	440 U
1,2,4,5-Tetrachlorobenzene	550 U	500 U	670 U	560 U
2,2'-Oxybis(1-chloropropane)	440 U	400 U	530 U	440 U
2,4,5-Trichlorophenol	1,100 U	990 U	1,300 U	1,100 U
2,4,6-Trichlorophenol	630 U	580 U	770 U	640 U
2,4-Dichlorophenol	590 U	540 U	720 U	600 U
2,4-Dimethylphenol	660 U	600 U	800 U	670 U
2,4-Dinitrophenol	1,500 U	1,400 U	1,800 U	1,500 U
2,4-Dinitrotoluene	440 U	400 U	530 U	440 U
2,6-Dinitrotoluene	440 U	400 U	530 U	440 U
2-Chloronaphthalene	26 U	24 U	32 U	27 U
2-Chlorophenol	660 U	600 U	800 U	670 U
2-Methylnaphthalene	26 U	24 U	32 U	27 U
2-Methylphenol	790 U	720 U	960 U	810 U
2-Nitroaniline	1,100 U	990 U	1,300 U	1,100 U
2-Nitrophenol	670 U	610 U	820 U	680 U
3- and 4-Methylphenol	750 U	680 U	910 U	760 U
3,3'-Dichlorobenzidine	460 U	420 U	560 U	470 U
3-Nitroaniline	1,100 U	990 U	1,300 U	1,100 U
4,6-Dinitro-2-methylphenol	1,400 U	1,300 U	1,800 U	1,500 U
4-Bromophenyl-phenylether	440 U	400 U	530 U	440 U
4-Chloro-3-methylphenol	660 U	600 U	800 U	670 U
4-Chloroaniline	470 U	430 U	580 U	480 U
4-Chlorophenyl-phenylether	440 U	400 U	530 U	440 U

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Station ID	CAS04-SD08		CAS04-SD09	
Sample ID	CAS04-SD08-1209A	CAS04-SD08-1209B	CAS04-SD09-1209A	CAS04-SD09-1209B
Sample Date	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name				
4-Methylphenol	NA	NA	NA	NA
4-Nitroaniline	1,100 U	990 U	1,300 U	1,100 U
4-Nitrophenol	1,200 U	1,100 U	1,500 U	1,200 U
Acenaphthene	26 U	24 U	3.2 J	27 U
Acenaphthylene	26 U	24 U	5.4 J	27 U
Acetophenone	710 UL	650 UL	860 UL	720 UL
Anthracene	26 U	24 U	2.3 J	27 U
Atrazine	440 U	400 U	530 U	440 U
Benzaldehyde	470 U	430 U	580 U	480 U
Benzo(a)anthracene	14 B	12 B	53	12 B
Benzo(a)pyrene	9 J	6.4 J	54	6 J
Benzo(b)fluoranthene	26 U	14 B	82	18 B
Benzo(g,h,i)perylene	26 UL	8.6 L	16 L	27 UL
Benzo(k)fluoranthene	26 U	4.2 J	25 J	27 U
bis(2-Chloroethoxy)methane	440 U	400 U	530 U	440 U
bis(2-Chloroethyl)ether	440 U	400 U	530 U	440 U
bis(2-Chloroisopropyl)ether	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	100 J	89 J	160 U	130 U
Butylbenzylphthalate	440 U	400 U	530 U	440 U
Caprolactam	580 R	530 R	700 R	590 R
Carbazole	26 U	7.3 J	9 J	6.5 J
Chrysene	3.1 J	24 U	55	27 U
Dibenz(a,h)anthracene	26 U	14 J	16 J	27 U
Dibenzofuran	440 U	400 U	530 U	440 U
Diethylphthalate	440 U	400 U	530 U	440 U
Dimethyl phthalate	440 U	400 U	530 U	440 U
Di-n-butylphthalate	130 U	120 U	160 U	130 U
Di-n-octylphthalate	840 U	770 U	1,000 U	860 U
Fluoranthene	22 J	10 J	110	14 J
Fluorene	26 U	24 U	5.7 B	27 U
Hexachlorobenzene	26 U	24 U	32 U	27 U
Hexachlorobutadiene	440 U	400 U	530 U	440 U
Hexachlorocyclopentadiene	440 U	400 U	530 U	440 U
Hexachloroethane	26 U	24 U	32 U	27 U
Indeno(1,2,3-cd)pyrene	11 J	12 J	42	8.1 J
Isophorone	440 U	400 U	530 U	440 U
Naphthalene	26 U	24 U	32 U	27 U
n-Nitroso-di-n-propylamine	440 U	400 U	530 U	440 U
n-Nitrosodiphenylamine	870 UL	790 UL	1,000 UL	890 UL
Nitrobenzene	440 U	400 U	530 U	440 U
Pentachlorophenol	130 UL	19 J	160 UL	130 UL
Phenanthrene	9.7 J	5.2 J	74	9.6 J
Phenol	620 U	560 U	750 U	630 U
Pyrene	15 J	5.3 J	110	14 J
Pesticide/Polychlorinated Biphenyls (UG/KG)				
4,4'-DDD	21 J	4.7 J	12 J	14
4,4'-DDE	6.7	2 J	13 J	5
4,4'-DDT	43 J	120 J	4.6 J	1.3 J
Aldrin	1 J	2.1 U	2.7 UJ	2.3 U
alpha-BHC	2.4 U	2.1 U	2.7 UJ	2.3 U
alpha-Chlordane	2.4 U	2.1 U	2.7 UJ	2.3 U
Aroclor-1016	25 U	22 U	29 U	24 U
Aroclor-1221	58 U	52 U	68 U	56 U
Aroclor-1232	39 U	34 U	45 U	37 U
Aroclor-1242	25 U	22 U	20 J	24 U
Aroclor-1248	26 U	23 U	30 U	25 U
Aroclor-1254	24 U	21 U	27 U	23 U
Aroclor-1260	230	30	29 U	24 U
beta-BHC	2.4 U	2.1 U	2.7 UJ	2.3 U
delta-BHC	2.4 U	2.1 U	2.7 UJ	2.3 U
Dieldrin	4.6 U	4 U	5.3 UJ	3.3 J
Endosulfan I	2.4 U	2.1 U	1.3 J	0.63 J
Endosulfan II	2.9 J	4 U	1.5 J	4.4 U
Endosulfan sulfate	18 J	2 J	5.3 UJ	4.4 U
Endrin	4.6 U	4 U	5.3 UJ	4.4 U
Endrin aldehyde	4.6 U	4 U	5.3 UJ	4.4 U
Endrin ketone	4.6 U	4 U	5.3 UJ	4.4 U
gamma-BHC (Lindane)	2.4 U	2.1 U	2.7 UJ	2.3 U
gamma-Chlordane	1.4 J	2.1 U	2 J	2.3 U
Heptachlor	2.4 U	2.1 U	2.7 UJ	2.3 U
Heptachlor epoxide	2.4 U	2.1 U	2.7 UJ	2.3 U
Methoxychlor	24 U	21 U	27 UJ	23 U
Toxaphene	46 U	40 U	53 UJ	44 U
Explosives (UG/KG)				
1,3,5-Trinitrobenzene	NA	NA	NA	NA
1,3-Dinitrobenzene	NA	NA	NA	NA
2,4,6-Trinitrotoluene	NA	NA	NA	NA

Station ID	CAS04-SD08		CAS04-SD09	
Sample ID	CAS04-SD08-1209A	CAS04-SD08-1209B	CAS04-SD09-1209A	CAS04-SD09-1209B
Sample Date	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name				
2-Amino-4,6-dinitrotoluene	NA	NA	NA	NA
2-Nitrotoluene	NA	NA	NA	NA
3-Nitrotoluene	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	NA	NA	NA	NA
4-Nitrotoluene	NA	NA	NA	NA
HMX	NA	NA	NA	NA
RDX	NA	NA	NA	NA
Tetryl	NA	NA	NA	NA
Total Metals (MG/KG)				
Aluminum	6,550	3,170	7,320	6,900
Antimony	0.34 B	0.44 B	0.44 B	0.2 B
Arsenic	5 L	2.7 L	10.4 L	13.2 L
Barium	19.5	9.6	21.8	19.6
Beryllium	0.39 J	0.21 J	0.38 J	0.4 J
Cadmium	0.65	0.21	0.16	0.19
Calcium	12,400	19,800	2,270	2,600
Chromium	17.3 L	13.3 L	9.4 L	14.5 L
Cobalt	2.4 J	0.8 J	1.7 J	2.2 J
Copper	24.6 J	3.1 J	5.6 J	2.8 J
Cyanide	0.91 U	0.84 U	1.2 U	0.91 U
Iron	13,600	4,260	6,400	7,550
Lead	10.6	3.4	14.2	7.2
Magnesium	1,750	777	545	861
Manganese	62.2	17	21.7	15.9
Mercury	0.01 J	0.04 U	0.04 J	0.01 J
Nickel	6.9	2.9	4.6 J	4.9
Potassium	1,380 K	844 K	501 K	839 K
Selenium	0.25 J	0.39 J	1.5 U	0.91 U
Silver	1.3 U	0.98 U	2.2 U	0.08 B
Sodium	140	210	29.9 B	26.3 B
Thallium	1.3 U	0.98 U	0.5 J	1.4 U
Vanadium	19.5	17.2	15.6	18.5
Zinc	64.5	14	49.9	24.6
Acid Volatile Sulfide/Simultaneously Extractable Metals (UMOL/G)				
Zinc, SEM	NA	NA	NA	NA
Acid volatile sulfide	NA	NA	NA	NA
Cadmium, SEM	NA	NA	NA	NA
Copper, SEM	NA	NA	NA	NA
Lead, SEM	NA	NA	NA	NA
Mercury, SEM	NA	NA	NA	NA
Nickel, SEM	NA	NA	NA	NA
Silver, SEM	NA	NA	NA	NA
Wet Chemistry				
pH	8	8.3	7.2	7.5
Total organic carbon (TOC) (UG/G)	9,900	2,500	40,000	16,000

Notes:

Shading indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
D - Compound identified in an analysis at a secondary dilution factor
J - Analyte present, value may or may not be accurate or precise
JP - Analyte present, Difference between the concentration on the two columns is greater than 20%
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

CTO-190
Cheatham Annex Site 4
Surface Soil Data Raw Analytical Results
December 2009

Station ID	CAS004-4HA01	CAS004-4HA02		CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS004-4HA06	CAS04-SS01	CAS04-SS02	CAS04-SS03	CAS04-SS04	CAS04-SS05
Sample ID	CAS004-4HA01-00-1199	CAS004-4HA02-00-1199	CAS004-4HA02D-00-1199	CAS004-4HA03-00-1199	CAS004-4HA04-00-1199	CAS004-4HA05-00-1199	CAS004-4HA06-00-1199	CAS04-SS01-1109	CAS04-SS02-1109	CAS04-SS03-1109	CAS04-SS04-1109	CAS04-SS05-1109
Sample Date	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Chemical Name												
Volatile Organic Compounds (UG/KG)												
1,1,1-Trichloroethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	6 U	7 U	7 UJ	7 UJ	7 UJ
1,1,2,2-Tetrachloroethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	NA	NA	6 U	7 U	7 UJ	7 UJ	7 UJ
1,1,2-Trichloroethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
1,1-Dichloroethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	6 U	7 U	7 UJ	7 UJ	7 UJ
1,1-Dichloroethene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
1,2,4-Trichlorobenzene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	5 U	6 U	6 UJ	6 UJ	6 UJ
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	5 UJ	6 UJ	6 UJ	6 UJ	6 UJ
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	5 U	6 U	6 UJ	6 UJ	6 UJ
1,2-Dichlorobenzene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	5 U	6 U	6 UJ	6 UJ	6 UJ
1,2-Dichloroethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
1,2-Dichloroethene (total)	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	NA	NA	NA	NA	NA
1,2-Dichloropropane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
1,3-Dichlorobenzene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	5 U	6 U	6 UJ	6 UJ	6 UJ
1,4-Dichlorobenzene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	5 U	6 U	6 UJ	6 UJ	6 UJ
2-Butanone	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	26 U	31 U	28 UJ	30 UJ	30 UJ
2-Hexanone	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	26 U	31 U	28 UJ	30 UJ	30 UJ
4-Methyl-2-pentanone	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	26 U	31 U	28 UJ	30 UJ	30 UJ
Acetone	5 B	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	70 B	100	78 B	94 J	120 J
Benzene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Bromodichloromethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Bromoform	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Bromomethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	10 U	12 U	11 UJ	12 UJ	12 UJ
Carbon disulfide	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Carbon tetrachloride	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Chlorobenzene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Chloroethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	10 U	12 U	11 UJ	12 UJ	12 UJ
Chloroform	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	6 U	7 U	7 UJ	7 UJ	7 UJ
Chloromethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	10 U	12 U	11 UJ	12 UJ	12 UJ
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	6 U	7 U	7 UJ	7 UJ	7 UJ
cis-1,3-Dichloropropene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	5 U	6 U	6 UJ	6 UJ	6 UJ
Dibromochloromethane	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	NA	NA	10 U	12 U	11 UJ	12 UJ	12 UJ
Ethylbenzene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	5 U	6 U	6 UJ	6 UJ	6 UJ
m- and p-Xylene	NA	NA	NA	NA	NA	NA	NA	12 U	14 U	12 UJ	13 UJ	13 UJ
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	10 U	11 U	10 UJ	11 UJ	11 UJ
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	5 U	6 U	6 UJ	6 UJ	6 UJ
Methylene chloride	7 B	8 B	11.9 U	9 B	11 B	11 B	12.1 UL	26 U	31 U	28 UJ	30 UJ	30 UJ
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	10 U	11 U	10 UJ	11 UJ	11 UJ
o-Xylene	NA	NA	NA	NA	NA	NA	NA	5 U	6 U	6 UJ	6 UJ	6 UJ
Styrene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	5 U	2 J	2 J	6 UJ	6 UJ
Tetrachloroethene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	5 U	6 U	6 UJ	6 UJ	6 UJ
Toluene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	5 U	6 U	6 UJ	2 J	6 UJ
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	7 U	9 U	8 UJ	8 UJ	8 UJ
trans-1,3-Dichloropropene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	7 U	9 U	8 UJ	8 UJ	8 UJ
Trichloroethene	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	6 U	7 U	7 UJ	7 UJ	7 UJ
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	NA	NA	10 U	12 U	11 UJ	12 UJ	12 UJ
Vinyl chloride	11.2 U	13.4 U	11.9 U	11.6 U	14.8 U	14.8 R	12.1 UL	10 U	12 U	11 UJ	12 UJ	12 UJ
Xylene, total	11.2 U	2 J	11.9 U	11.6 U	14.8 UL	14.8 R	12.1 UL	16 U	18 U	17 UJ	18 UJ	18 UJ
Semivolatile Organic Compounds (UG/KG)												
1,1-Biphenyl	NA	NA	NA	NA	NA	NA	NA	340 U	410 U	360 U	360 U	380 U
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA	NA	NA	430 U	520 U	460 U	460 U	480 U
2,2'-Oxybis(1-chloropropane)	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
2,4,5-Trichlorophenol	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	850 U	1,000 U	900 U	900 U	940 U
2,4,6-Trichlorophenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	500 U	590 U	520 U	530 U	550 U
2,4-Dichlorophenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	460 U	560 U	490 U	490 U	510 U
2,4-Dimethylphenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	520 U	620 U	550 U	550 U	570 U
2,4-Dinitrophenol	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	1,200 U	1,400 U	1,200 U	1,200 U	1,300 U
2,4-Dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	340 U	410 U	360 U	360 U	380 U
2,6-Dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	340 U	410 U	360 U	360 U	380 U
2-Chloronaphthalene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
2-Chlorophenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	520 U	620 U	550 U	550 U	570 U
2-Methylnaphthalene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
2-Methylphenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	620 U	740 U	660 U	660 U	680 U
2-Nitroaniline	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	850 U	1,000 U	900 U	900 U	940 U
2-Nitrophenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	530 U	630 U	560 U	560 U	580 U
3- and 4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	590 U	700 U	620 U	630 U	650 U
3,3'-Dichlorobenzidine	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	360 U	430 U	380 U	380 U	400 U
3-Nitroaniline	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	850 U	1,000 U	900 U	900 U	940 U
4,6-Dinitro-2-methylphenol	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	1,100 U	1,400 U	1,200 U	1,200 U	1,200 U
4-Bromophenyl-phenylether	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
4-Chloro-3-methylphenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	520 U	620 U	550 U	550 U	570 U
4-Chloroaniline	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	370 U	440 U	390 U	400 U	410 U
4-Chlorophenyl-phenylether	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U

Station ID	CAS004-4HA01	CAS004-4HA02		CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS004-4HA06	CAS04-SS01	CAS04-SS02	CAS04-SS03	CAS04-SS04	CAS04-SS05
Sample ID	CAS004-4HA01-00-1199	CAS004-4HA02-00-1199	CAS004-4HA02D-00-1199	CAS004-4HA03-00-1199	CAS004-4HA04-00-1199	CAS004-4HA05-00-1199	CAS004-4HA06-00-1199	CAS04-SS01-1109	CAS04-SS02-1109	CAS04-SS03-1109	CAS04-SS04-1109	CAS04-SS05-1109
Sample Date	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Chemical Name												
4-Methylphenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	NA	NA	NA	NA	NA
4-Nitroaniline	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	850 U	1,000 U	900 U	900 U	940 U
4-Nitrophenol	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	960 U	1,100 U	1,000 U	1,000 U	1,100 U
Acenaphthene	380 U	330 J	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
Acenaphthylene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
Acetophenone	NA	NA	NA	NA	NA	NA	NA	560 U	670 U	590 U	590 U	620 U
Anthracene	380 U	530 J	2,100 U	400 U	2,600 U	5,500 U	1,700 J	4 J	4.2 J	1.7 J	2.4 J	1.8 J
Atrazine	NA	NA	NA	NA	NA	NA	NA	340 U	410 U	360 U	360 U	380 U
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	370 UJ	440 UJ	390 UJ	400 U	410 U
Benzo(a)anthracene	380 U	1,100 J	290 J	400 U	2,600 U	1,100 J	8,800	16 J	23 J	14 J	16 J	10 J
Benzo(a)pyrene	380 U	950 J	440 J	400 U	2,600 U	2,300 J	7,000	7.8 J	14 J	5.8 J	10 J	4.4 J
Benzo(b)fluoranthene	380 U	1,100 J	320 J	76 J	330 J	1,700 J	6,800	18 J	29	16 J	20 J	10 J
Benzo(g,h,i)perylene	380 U	650 J	340 J	61 J	2,600 U	1,200 J	3,400 J	21 UL	2.5 L	22 UL	22 UL	23 UL
Benzo(k)fluoranthene	380 U	770 J	470 J	53 J	320 J	1,700 J	6,800	3.7 J	6.3 J	22 U	5.5 J	23 U
bis(2-Chloroethoxy)methane	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
bis(2-Chloroethyl)ether	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
bis(2-Ethylhexyl)phthalate	49 B	16,000 B	3,000 B	100 B	11,000 B	5,500 U	3,900 U	100 U	120 U	110 U	110 U	66 J
Butylbenzylphthalate	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
Caprolactam	NA	NA	NA	NA	NA	NA	NA	450 U	540 U	480 U	480 R	500 R
Carbazole	380 U	250 J	2,100 U	400 U	2,600 U	5,500 U	3,900 U	2.6 J	3.8 J	22 U	3.6 J	2.1 J
Chrysene	380 U	1,300 J	520 J	75 J	410 J	2,200 J	8,600	4 J	8.6 J	22 U	7.7 J	23 U
Dibenz(a,h)anthracene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	1,400 J	10 J	13 J	22 U	22 U	23 U
Dibenzofuran	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
Diethylphthalate	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
Dimethyl phthalate	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
Di-n-butylphthalate	380 U	2,100 U	2,100 U	41 B	9,900 B	5,500 U	3,900 U	100 U	120 U	110 U	110 U	110 U
Di-n-octylphthalate	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	660 U	790 U	700 U	700 U	730 U
Fluoranthene	380 U	2,700	660 J	49 J	510 J	1,800 J	14,000	21	36	17 J	29	14 J
Fluorene	380 U	250 J	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
Hexachlorobenzene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
Hexachlorobutadiene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
Hexachlorocyclopentadiene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
Hexachloroethane	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
Indeno(1,2,3-cd)pyrene	380 U	600 J	250 J	48 J	2,600 U	1,300 J	3,400 J	12 K	18 K	9.8 K	20 J	23 U
Isophorone	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
Naphthalene	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	21 U	25 U	22 U	22 U	23 U
n-Nitroso-di-n-propylamine	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	340 U	410 U	360 U	360 U	380 U
n-Nitrosodiphenylamine	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	680 U	820 U	720 U	720 U	750 U
Nitrobenzene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	340 U	410 U	360 U	360 U	380 U
Pentachlorophenol	960 U	5,200 U	5,200 U	1,000 U	6,600 U	14,000 U	9,700 U	100 U	120 U	110 U	110 U	110 U
Phenanthrene	380 U	2,400	560 J	400 U	2,600 U	1,400 J	5,500	16 J	21 J	8.4 J	15 J	7.7 J
Phenol	380 U	2,100 U	2,100 U	400 U	2,600 U	5,500 U	3,900 U	480 U	580 U	510 U	520 U	540 U
Pyrene	380 U	2,300	800 J	46 J	440 J	3,000 J	11,000	14 J	21 J	7 J	17 J	6.9 J
Pesticide/Polychlorinated Biphenyls (UG/KG)												
4,4'-DDD	3.8 U	4.2 U	4.2 U	4 U	5.2 U	27 U	7.6 K	3.7 UJ	4.1 U	3.8 U	3.5 U	3.7 U
4,4'-DDE	3.8 U	9.6 J	4.2 U	4 U	43 J	27 U	3.9 U	0.67 B	4.1 U	0.72 B	1.2 L	0.9 L
4,4'-DDT	3.8 U	7 J	4.6 J	4 U	9.4	220 K	18 K	1.3 B	4.1 U	2.2 B	3.5 U	1.7 J
Aldrin	2 U	2.1 U	2.2 U	2.1 U	2.7 U	33 K	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
alpha-BHC	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
alpha-Chlordane	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	0.54 J	1.9 U
Aroclor-1016	38 U	42 U	42 U	40 U	52 U	270 U	39 U	20 U	22 U	20 U	19 U	20 U
Aroclor-1221	77 U	85 U	85 U	82 U	110 U	560 U	79 U	47 U	52 U	48 U	44 U	47 U
Aroclor-1232	38 U	42 U	42 U	40 U	52 U	270 U	39 U	31 U	34 U	32 U	30 U	31 U
Aroclor-1242	38 U	42 U	42 U	40 U	52 U	1,000 K	39 U	20 U	22 U	20 U	19 U	20 U
Aroclor-1248	38 U	42 U	42 U	40 U	52 U	270 U	39 U	21 U	23 U	22 U	20 U	21 U
Aroclor-1254	38 U	42 U	42 U	40 U	52 U	270 U	39 U	19 U	21 U	19 U	18 U	19 U
Aroclor-1260	53	64 J	75 J	53 J	600 J	2,700 K	91 K	20 U	35	20 U	33	19 J
beta-BHC	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
delta-BHC	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
Dieldrin	3.8 U	4.2 U	4.2 U	4 U	5.2 U	27 U	3.9 U	3.7 UJ	4.1 U	3.8 U	3.5 U	3.7 U
Endosulfan I	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
Endosulfan II	4.4 J	4.2 U	4.2 U	5.7 J	5.2 U	27 U	3.9 U	3.7 UJ	4.1 U	3.8 U	3.5 U	3.7 U
Endosulfan sulfate	3.8 U	4.2 U	4.2 U	4 U	5.2 U	27 U	3.9 U	3.7 UJ	4.1 U	3.8 U	3.5 U	3.7 U
Endrin	6.3 J	4.2 U	4.2 U	4 U	5.2 U	28 K	3.9 U	3.7 UJ	4.1 U	3.5 J	3.5 U	3.7 U
Endrin aldehyde	3.8 U	4.2 U	4.2 U	4 U	5.2 U	77 K	3.9 U	3.7 UJ	4.1 U	1.9 J	2.1 J	1 J
Endrin ketone	3.8 U	4.2 U	4.5	4 U	5.2 U	87 K	3.9 U	3.7 UJ	4.1 U	3.8 U	3.5 U	3.7 U
gamma-BHC (Lindane)	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
gamma-Chlordane	2 U	2.1 U	2.2 U	2.1 U	2.7 U	15 K	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
Heptachlor	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
Heptachlor epoxide	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U	1.9 UJ	2.1 U	1.9 U	1.8 U	1.9 U
Methoxychlor	20 U	21 U	22 U	21 U	27 U	140 U	20 U	19 UJ	21 U	19 U	18 U	19 U
Toxaphene	200 U	210 U	220 U	210 U	270 U	1,400 U	200 U	37 UJ	41 U	38 U	35 U	37 U
Explosives (UG/KG)												
1,3,5-Trinitrobenzene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA

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Station ID	CAS004-4HA01	CAS004-4HA02		CAS004-4HA03	CAS004-4HA04	CAS004-4HA05	CAS004-4HA06	CAS04-SS01	CAS04-SS02	CAS04-SS03	CAS04-SS04	CAS04-SS05
Sample ID	CAS004-4HA01-00-1199	CAS004-4HA02-00-1199	CAS004-4HA02D-00-1199	CAS004-4HA03-00-1199	CAS004-4HA04-00-1199	CAS004-4HA05-00-1199	CAS004-4HA06-00-1199	CAS04-SS01-1109	CAS04-SS02-1109	CAS04-SS03-1109	CAS04-SS04-1109	CAS04-SS05-1109
Sample Date	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/12/99	11/03/09	11/03/09	11/03/09	11/03/09	11/03/09
Chemical Name												
2-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
3-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
4-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
HMX	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
RDX	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
Tetryl	500 U	500 U	500 U	450 U	450 U	500 U	480 U	NA	NA	NA	NA	NA
Total Metals (MG/KG)												
Aluminum	4,560 L	5,810 L	7,160 L	6,760 L	9,560 L	6,260 L	6,320 L	6,360	29,400	4,560	5,990	18,000
Antimony	0.49 U	0.46 U	0.55 U	0.47 U	0.67 J	12.6 B	0.44 UJ	0.08 L	0.2 L	0.09 L	0.08 L	0.14 L
Arsenic	2.9 L	2.7 L	2.6 L	3 L	4.1 L	3.5 L	2.7 L	1.6	6.4	1.4	1.1	3.6
Barium	20.3 J	36.6 J	27.1 J	25.5 J	164	68	101 J	17.6	32.1	14.8	24.8 J	22.2 J
Beryllium	0.33 B	0.64 B	0.36 B	0.35 B	0.68 B	0.65 B	0.32 B	0.24 J	0.76	0.22 J	0.46 J	0.42
Cadmium	0.08 U	0.07 U	0.08 U	0.07 U	0.74 J	3.3	0.34 U	0.91 U	1.2 U	0.98 U	0.96 U	0.77 U
Calcium	3,750	1,440	1,110 J	8,420	7,320	6,670	2,940	267	137	637	345 J	238 J
Chromium	9.4	8.7	9.6	11.8	16.9	19	56.6	9.2 K	45.2 K	7.3 K	6.9	26.6
Cobalt	1.4 U	2.8 J	3.7 J	1.7 J	4.1 J	4.6 J	8.8 J	1.2	3.5	1.1	2.1	2.3
Copper	4.5 B	10.5	12	3.8 B	26	150	77.8 J	1.8 K	4.4 K	2.4 K	2.5	3.1
Cyanide	0.02 UL	0.12 L	0.13 L	0.02 UL	0.03 UL	0.11 L	0.07 L	0.77 U	0.84 U	0.7 U	0.77 U	0.77 U
Iron	8,900 L	9,840 L	8,570 L	8,910 L	14,600 L	14,300 L	61,700 L	7,090	28,300	6,210	4,370 J	15,000 J
Lead	12.8	22.7	24	11.6	39.5	129	105 J	7.9 K	12.6 K	11.7 K	10	23.7
Magnesium	619 J	514 J	669 J	800 J	1,110 J	2,010	2,140	480 K	2,280 K	351 K	454 J	1,200 J
Manganese	48.7	233	127	43.2	151	175	302 J	27.7 K	33.6 K	28.8 K	59 J	24.7 J
Mercury	0.04 J	0.31	0.36	0.09 J	0.76	0.88	0.06 J	0.01 J	0.03 J	0.02 J	0.03 J	0.03 J
Nickel	2.2 B	3.8 B	4.1 B	4 B	10.1 J	12.1	39.6	2.3 J	8.1 J	2.2 J	3.1 J	5.6
Potassium	789 J	283 B	366 J	928 J	798 J	1,420	961 J	406 K	2,580 K	280 K	307 K	1,210 K
Selenium	0.67 U	0.63 U	0.75 U	0.64 U	1 J	0.81 U	0.6 U	0.22 J	0.27 J	0.18 J	0.28 J	0.32 J
Silver	2.8 B	2.6 B	3 B	2.4 B	5.2 B	5.2 B	20.6 L	1.4 U	1.8 U	1.5 U	1.4 U	1.2 U
Sodium	24.4 B	23.1 B	22.6 B	72.9 B	73.8 B	60.5 B	73.1 B	18.4 K	49.6 K	14.4 K	15.5 K	35.6 K
Thallium	0.54 UL	0.5 UL	0.6 UL	0.51 UL	0.72 UL	0.65 UL	1.1 L	0.09 B	0.21 B	0.08 B	0.08 B	0.2 B
Vanadium	13.9	13.9	15.1	16.6	22.2	23.5	35.7 J	13.3	63.6	11.9	9.8	41.7
Zinc	28.6 B	106	102	32.5 B	273	324	122 J	13 K	28.8 K	10.4 K	14.9	20.3
Wet Chemistry												
pH	NA	NA	NA	NA	NA	NA	NA	5	6	5.2	5.5	4.6
Total organic carbon (TOC) (UG/G)	NA	NA	NA	NA	NA	NA	NA	5,600	16,000	17,000	17,000	18,000
Grain Size (PCT/P)												
GS07 Sieve 1" (25.0 mm)	NA	NA	NA	NA	NA	NA	NA	100	100	100	100	100
GS08 Sieve 0.75" (19.0 mm)	NA	NA	NA	NA	NA	NA	NA	100	100	100	100	100
GS09 Sieve 0.5" (12.5 mm)	NA	NA	NA	NA	NA	NA	NA	100	100	100	100	100
GS10 Sieve 0.375" (9.5 mm)	NA	NA	NA	NA	NA	NA	NA	100	100	100	100	100
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	100	100	100	100	100
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	100	99	100	100	100
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	99	99	99	99	99
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	95	95	95	94	96
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	74	70	77	73	80
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	45	41	48	45	52
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	30	30	31	29	37

Notes:

Shading indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in associated blanks

J - Analyte present, value may or may not be accurate or precise

K - Analyte present, value may be biased high, actual value may be lower

L - Analyte present, value may be biased low, actual value may be higher

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UL - Analyte not detected, quantitation limit is probably higher

MG/KG - Milligrams per kilogram

PCT/P - Percent Passed

PH - pH units

UG/G - Micrograms per gram

UG/KG - Micrograms per kilogram

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Station ID	CAS04-SW01	CAS04-SW02	CAS04-SW03	CAS04-SW04	CAS04-SW05	CAS04-SW06	CAS04-SW07		CAS04-SW08	CAS04-SW09
Sample ID	CAS04-SW01-1209	CAS04-SW02-1209	CAS04-SW03-1209	CAS04-SW04-1209	CAS04-SW05-1209	CAS04-SW06-1209	CAS04-SW07-1209	CAS04-SW07P-1209	CAS04-SW08-1209	CAS04-SW09-1209
Sample Date	12/07/09	12/07/09	12/07/09	12/07/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name										
Volatile Organic Compounds (UG/L)										
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	4 B
Benzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Carbon disulfide	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Chloroform	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon-12)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m- and p-Xylene	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl acetate	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methylcyclohexane	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl-tert-butyl ether (MTBE)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
o-Xylene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Toluene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane(Freon-11)	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Vinyl chloride	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Xylene, total	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Semivolatile Organic Compounds (UG/L)										
1,1-Biphenyl	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
1,2,4,5-Tetrachlorobenzene	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
2,2'-Oxybis(1-chloropropane)	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
2,4,5-Trichlorophenol	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U
2,4,6-Trichlorophenol	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
2,4-Dichlorophenol	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
2,4-Dimethylphenol	13 U	13 U	13 U	13 U	13 U	13 U	13 U	13 U	13 U	13 U
2,4-Dinitrophenol	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U
2,4-Dinitrotoluene	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
2,6-Dinitrotoluene	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
2-Chloronaphthalene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
2-Chlorophenol	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
2-Methylnaphthalene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
2-Methylphenol	11 U	11 U	11 U	11 U	11 U	12 U	12 U	11 U	11 U	11 U
2-Nitroaniline	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U
2-Nitrophenol	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
3- and 4-Methylphenol	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U	16 U
3,3'-Dichlorobenzidine	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
3-Nitroaniline	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U
4,6-Dinitro-2-methylphenol	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U
4-Bromophenyl-phenylether	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
4-Chlorophenyl-phenylether	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
4-Nitroaniline	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U

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Station ID	CAS04-SW01	CAS04-SW02	CAS04-SW03	CAS04-SW04	CAS04-SW05	CAS04-SW06	CAS04-SW07		CAS04-SW08	CAS04-SW09
Sample ID	CAS04-SW01-1209	CAS04-SW02-1209	CAS04-SW03-1209	CAS04-SW04-1209	CAS04-SW05-1209	CAS04-SW06-1209	CAS04-SW07-1209	CAS04-SW07P-1209	CAS04-SW08-1209	CAS04-SW09-1209
Sample Date	12/07/09	12/07/09	12/07/09	12/07/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name										
4-Nitrophenol	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U	24 U
Acenaphthene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Acenaphthylene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Acetophenone	11 U	11 U	11 U	11 U	11 U	12 U	12 U	11 U	11 U	11 U
Anthracene	0.19 U	0.19 UL	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Atrazine	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Benzaldehyde	10 U	9 U	9 UJ	9 U	9 UJ	10 UJ	10 UJ	10 UJ	9 UJ	9 UJ
Benzo(a)anthracene	0.19 U	0.19 U	0.19 B	0.34 B	0.17 B	0.19 U	0.19 U	0.19 U	0.19 U	0.16 B
Benzo(a)pyrene	0.19 U	0.19 U	0.073 J	0.24 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Benzo(b)fluoranthene	0.19 U	0.19 U	0.19 U	0.58 B	0.2 B	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Benzo(g,h,i)perylene	0.19 U	0.19 U	0.19 U	0.16 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Benzo(k)fluoranthene	0.19 U	0.19 U	0.19 U	0.15 J	0.069 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
bis(2-Chloroethoxy)methane	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
bis(2-Chloroethyl)ether	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
bis(2-Ethylhexyl)phthalate	0.86 J	0.85 L	1.3	0.75 J	0.94 U	0.96 U	0.96 U	1.5	1.5	0.48 J
Butylbenzylphthalate	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Caprolactam	10 U	9 U	9 U	9 U	9 UL	10 UL	10 UL	10 UL	9 UL	9 UL
Carbazole	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Chrysene	0.19 U	0.19 U	0.19 U	0.08 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Dibenz(a,h)anthracene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Dibenzofuran	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Diethylphthalate	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Dimethyl phthalate	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Di-n-butylphthalate	0.95 U	0.94 U	0.94 U	0.94 U	0.94 U	0.96 U	0.96 U	0.95 U	0.94 U	0.94 U
Di-n-octylphthalate	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Fluoranthene	0.19 U	0.19 U	0.13 J	0.32	0.18 J	0.19 U	0.19 U	0.19 U	0.19 U	0.11 J
Fluorene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Hexachlorobenzene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Hexachlorobutadiene	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Hexachlorocyclopentadiene	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Hexachloroethane	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Indeno(1,2,3-cd)pyrene	0.19 U	0.19 U	0.19 U	0.24	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Isophorone	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Naphthalene	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
n-Nitroso-di-n-propylamine	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
n-Nitrosodiphenylamine	11 U	11 U	11 U	11 U	11 U	12 U	12 U	11 U	11 U	11 U
Nitrobenzene	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Pentachlorophenol	0.95 U	0.94 U	0.94 U	0.94 U	0.94 U	0.96 U	0.96 U	0.95 U	0.94 U	0.94 U
Phenanthrene	0.19 U	0.19 U	0.068 J	0.074 J	0.088 J	0.19 U	0.19 U	0.19 U	0.19 U	0.069 J
Phenol	10 U	9 U	9 U	9 U	9 U	10 U	10 U	10 U	9 U	9 U
Pyrene	0.19 U	0.19 U	0.1 J	0.29	0.29 J	0.19 U	0.19 U	0.065 J	0.19 U	0.23 J
Pesticide/Polychlorinated Biphenyls (UG/L)										
4,4'-DDD	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
4,4'-DDE	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
4,4'-DDT	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
Aldrin	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
alpha-BHC	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
alpha-Chlordane	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
Aroclor-1016	0.47 U	0.47 U	0.47 U	0.48 U	0.67 U	0.63 U	0.62 U	0.6 U	0.57 U	0.47 UL
Aroclor-1221	0.66 U	0.66 U	0.66 U	0.67 U	0.93 U	0.89 U	0.86 U	0.84 U	0.8 U	0.66 UL
Aroclor-1232	0.47 U	0.47 U	0.47 U	0.48 U	0.67 U	0.63 U	0.62 U	0.6 U	0.57 U	0.47 UL
Aroclor-1242	0.57 U	0.57 U	0.57 U	0.58 U	0.8 U	0.76 U	0.74 U	0.72 U	0.69 U	0.57 UL
Aroclor-1248	0.66 U	0.66 U	0.66 U	0.67 U	0.93 U	0.89 U	0.86 U	0.84 U	0.8 U	0.66 UL
Aroclor-1254	0.47 U	0.47 U	0.47 U	0.48 U	0.67 U	0.63 U	0.62 U	0.6 U	0.57 U	0.47 UL
Aroclor-1260	0.57 U	0.57 U	0.57 U	0.58 U	0.8 U	0.76 U	0.74 U	0.72 U	0.69 U	0.57 UL
beta-BHC	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
delta-BHC	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
Dieldrin	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
Endosulfan I	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
Endosulfan II	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
Endosulfan sulfate	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
Endrin	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
Endrin aldehyde	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
Endrin ketone	0.094 U	0.094 U	0.094 U	0.096 U	0.13 U	0.13 U	0.12 U	0.12 U	0.11 U	0.094 UJ
gamma-BHC (Lindane)	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
gamma-Chlordane	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
Heptachlor	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
Heptachlor epoxide	0.047 U	0.047 U	0.047 U	0.048 U	0.067 U	0.063 U	0.062 U	0.06 U	0.057 U	0.047 UJ
Methoxychlor	0.47 U	0.47 U	0.47 U	0.48 U	0.67 U	0.63 U	0.62 U	0.6 U	0.57 U	0.47 UJ
Toxaphene	0.94 U	0.94 U	0.94 U	0.96 U	1.3 U	1.3 U	1.2 U	1.2 U	1.1 U	0.94 UJ
Total Metals (UG/L)										
Aluminum	178 J	108 B	2,730	445	83.1 J	300 U	248 J	1,120	215 J	518
Antimony	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Arsenic	3.5 B	1.7 B	10.3	3.8 B	1.6 B	5 U	5 U	5 U	5 U	58
Barium	24.4	24.2	44.4	25.2	25.6	26.2	26.5	30.3	26.3	42.5
Beryllium	1 U	1 U	0.12 J	1 U	1 U	1 U	1 U	0.06 J	1 U	1 U
Cadmium	0.13 J	0.16 J	0.82 J	0.22 J	1 U	0.16 J	0.3 J	0.45 J	0.28 J	1 U

CTO-190
Cheatham Annex Site 4
Surface Water Data Raw Analytical Results
December 2009

Station ID	CAS04-SW01	CAS04-SW02	CAS04-SW03	CAS04-SW04	CAS04-SW05	CAS04-SW06	CAS04-SW07		CAS04-SW08	CAS04-SW09
Sample ID	CAS04-SW01-1209	CAS04-SW02-1209	CAS04-SW03-1209	CAS04-SW04-1209	CAS04-SW05-1209	CAS04-SW06-1209	CAS04-SW07-1209	CAS04-SW07P-1209	CAS04-SW08-1209	CAS04-SW09-1209
Sample Date	12/07/09	12/07/09	12/07/09	12/07/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09	12/08/09
Chemical Name										
Calcium	63,500	80,300	106,000	69,400	132,000	129,000	131,000	132,000	125,000	114,000
Chromium	3.3 B	2 B	6.3 B	2 B	1.5 B	1.5 B	2 B	4.1 B	1.9 B	1.9 B
Cobalt	0.34 J	0.45 J	1.5	0.45 J	0.29 J	0.4 J	0.66 J	1.1	0.63 J	0.61 J
Copper	7.8	3.9	25.9	7.6	1.3	1.4	2.3	7	3.4	1.6
Cyanide	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Iron	1,310	1,480	19,000	2,200	682	339	353	1,800	424	30,300
Lead	0.93 J	0.56 J	5.9	1.4	0.36 B	0.18 B	0.67 J	2.6	1.2	1.5
Magnesium	1,830	1,990	3,040	1,890	2,200	2,040	2,000	2,160	2,000	2,660
Manganese	42.6	53.4	142	74.2	72.8	19.8	6.6	12.5	11.8	250
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	1 B	1.1 B	3.5 J	1.7 B	0.65 B	1.1 B	1.4 B	2 J	1.5 B	0.6 B
Potassium	1,460	1,560	1,930	1,590	1,380 B	1,680	2,010	2,230	2,180	1,440 B
Selenium	5 U	5 U	5 U	0.86 J	0.82 J	1.3 J	1.3 J	1.1 J	1.2 J	5 U
Silver	1 U	0.05 J	0.06 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium	4,340	5,290	5,980	4,800	7,140	7,860	8,260	8,140	8,180	5,480
Thallium	0.13 B	2 U	2 U	0.15 B	0.19 B	2 U	2 U	2 U	2 U	2 U
Vanadium	2 B	1.4 B	8.3	1.7 B	0.72 B	1 B	1.3 B	4.6 J	1.8 B	2.1 B
Zinc	12.9 J	13.3 J	65.4	24.4 J	3.2 B	12.6 J	16.8 J	31.4	18.2 J	16.5 J
Dissolved Metals (UG/L)										
Aluminum, Dissolved	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Antimony, Dissolved	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U
Arsenic, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	16.6
Barium, Dissolved	19.8	20.8	24.2	22	23.8	24.3	24.4	25.4	23.9	23.8
Beryllium, Dissolved	0.06 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	0.18 J	0.06 J	1 U	1 U	1 U	0.14 J	0.18 J	0.18 J	0.19 J	1 U
Calcium, Dissolved	61,400	73,400	99,900	66,300	128,000	128,000	120,000	128,000	122,000	114,000
Chromium, Dissolved	1.9 B	1.6 B	1.5 B	0.72 B	1.4 B	1.1 B	1.3 B	1.5 B	1.4 B	1 B
Cobalt, Dissolved	0.45 J	0.26 J	0.41 J	0.27 J	0.2 J	0.53 J	0.43 J	0.49 J	0.56 J	0.67 J
Copper, Dissolved	4.3 B	2.5 B	1.9 B	3.2 B	2.2 B	1.6 B	2.6 B	3 B	2.2 B	3 B
Iron, Dissolved	96.6 J	50.9 J	17.5 J	119	8.7 B	5.2 B	13.3 B	100 U	7.9 B	5,680
Lead, Dissolved	0.25 B	0.26 B	0.32 B	0.66 B	0.35 B	0.15 B	0.3 B	0.27 B	0.28 B	0.22 B
Magnesium, Dissolved	1,750	1,880	2,180	1,800	2,150	2,030	1,780	1,910	1,860	3,110
Manganese, Dissolved	40.3	43.9	91.5	91.9	49.6	18.8	4.4 J	5.3	6.2	268
Mercury, Dissolved	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	1 J	1 J	1.1 J	1.3 J	0.54 B	0.89 B	1.2 B	0.95 B	0.95 B	0.98 B
Potassium, Dissolved	1,460	1,440	1,380	1,540	1,320 B	1,680	1,850	1,930	2,150	1,380 B
Selenium, Dissolved	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.84 J	1.6 J	5 U
Silver, Dissolved	0.1 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Sodium, Dissolved	4,580	5,040	5,910	4,740	7,120	7,840	7,410	8,030	8,020	5,550
Thallium, Dissolved	0.21 B	2 U	2 U	0.11 B	0.11 B	2 U	2 U	2 U	2 U	2 U
Vanadium, Dissolved	0.86 B	0.92 B	5 U	5 U	5 U	5 U	1.2 J	1.2 J	1.1 J	5 U
Zinc, Dissolved	10.5 B	7.5 B	6.5 B	10 B	5.2 B	11.9 B	14.8 B	16 B	12.8 B	19.8 J
Wet Chemistry										
Hardness (UG/L)	166,000	209,000	276,000	181,000	338,000	330,000	335,000	NA	321,000	297,000

Notes:

Shading indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
L - Analyte present, value may be biased low, actual value may be higher
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
UG/L - Micrograms per liter

SURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-00	4-HA02-00	4-HA02-00D	4-HA03-00	4-HA04-00	4-HA05-00	4-HA06-00
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Volatiles (ug/kg)							
1,1,1-Trichloroethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
1,1,2,2-Tetrachloroethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL
1,1,2-Trichloroethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
1,1-Dichloroethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
1,1-Dichloroethene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
1,2-Dichloroethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
1,2-Dichloroethene (total)	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
1,2-Dichloropropane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
cis-1,3-Dichloropropene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
trans-1,3-Dichloropropene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
2-Butanone	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
2-Hexanone	11.24 U	13.42 U	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL
4-Methyl-2-Pentanone	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Acetone	5 B	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Benzene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Bromodichloromethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Bromoform	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Bromomethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Carbon Disulfide	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Carbon Tetrachloride	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Chlorobenzene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL
Chloroethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Chloroform	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Chloromethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Dibromochloromethane	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Ethylbenzene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL
Methylene Chloride	7 B	8 B	11.87 U	9 B	11 B	11 B	12.07 UL
Styrene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL
Tetrachloroethene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL
Toluene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL
Trichloroethene	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Vinyl Chloride	11.24 U	13.42 U	11.87 U	11.58 U	14.79 U	14.79 UR	12.07 UL
Xylene (Total)	11.24 U	2 J	11.87 U	11.58 U	14.79 UL	14.79 UR	12.07 UL

SURFACE SOIL - ORGANIC COMPOUNDS
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NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-00 11/12/1999	4-HA02-00 11/12/1999	4-HA02-00D 11/12/1999	4-HA03-00 11/12/1999	4-HA04-00 11/12/1999	4-HA05-00 11/12/1999	4-HA06-00 11/12/1999
Semivolatiles (ug/kg)							
1,2,4-Trichlorobenzene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
1,2-Dichlorobenzene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
1,3-Dichlorobenzene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
1,4-Dichlorobenzene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2,2'-oxybis(1-Chloropropan	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2,4,5-Trichlorophenol	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
2,4,6-Trichlorophenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2,4-Dichlorophenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2,4-Dimethylphenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2,4-Dinitrophenol	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
2,4-Dinitrotoluene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2,6-Dinitrotoluene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2-Chloronaphthalene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2-Chlorophenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2-Methylnaphthalene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2-Methylphenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
2-Nitroaniline	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
2-Nitrophenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
3,3'-Dichlorobenzidine	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
3-Nitroaniline	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
4,6-Dinitro-2-Methylphenol	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
4-Bromophenyl phenylether	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
4-Chloro-3-Methylphenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
4-Chloroaniline	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
4-Chlorophenyl-phenylether	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
4-Methylphenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
4-Nitroaniline	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
4-Nitrophenol	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
Acenaphthene	380 U	330 J	2100 U	400 U	2600 U	5500 U	3900 U
Acenaphthylene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Anthracene	380 U	530 J	2100 U	400 U	2600 U	5500 U	1700 J
Benzo(a)Anthracene	380 U	1100 J	290 J	400 U	2600 U	1100 J	8800
Benzo(a)Pyrene	380 U	950 J	440 J	400 U	2600 U	2300 J	7000

SURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-00 11/12/1999	4-HA02-00 11/12/1999	4-HA02-00D 11/12/1999	4-HA03-00 11/12/1999	4-HA04-00 11/12/1999	4-HA05-00 11/12/1999	4-HA06-00 11/12/1999
Semivolatiles (ug/kg) (Cont)							
Benzo(b)Fluoranthene	380 U	1100 J	320 J	76 J	330 J	1700 J	6800
Benzo(g,h,i)Perylene	380 U	650 J	340 J	61 J	2600 U	1200 J	3400 J
Benzo(k)Fluoanthene	380 U	770 J	470 J	53 J	320 J	1700 J	6800
Bis(2-chloroethoxy)Methane	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Bis(2-chloroethyl)Ether	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Bis(2-Ethylhexyl)Phthalate	49 B	16000	3000	100 B	11000	5500 U	3900 U
Butylbenzylphthalate	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Carbazole	380 U	250 J	2100 U	400 U	2600 U	5500 U	3900 U
Chrysene	380 U	1300 J	520 J	75 J	410 J	2200 J	8600
Dibenz(a,h)Anthracene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	1400 J
Dibenzofuran	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Diethylphthalate	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Dimethyl Phthalate	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Di-n-Butylphthalate	380 U	2100 U	2100 U	41 B	9900	5500 U	3900 U
Di-n-Octyl Phthalate	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Fluoranthene	380 U	2700	660 J	49 J	510 J	1800 J	14000
Fluorene	380 U	250 J	2100 U	400 U	2600 U	5500 U	3900 U
Hexachlorobenzene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Hexachlorobutadiene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Hexachlorocyclopentadiene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Hexachloroethane	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Indeno(1,2,3-cd)Pyrene	380 U	600 J	250 J	48 J	2600 U	1300 J	3400 J
Isophorone	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Naphthalene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Nitrobenzene	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
N-Nitroso-Di-n-Propylamine	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
N-Nitrosodiphenylamine	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Pentachlorophenol	960 U	5200 U	5200 U	1000 U	6600 U	14000 U	9700 U
Phenanthrene	380 U	2400	560 J	400 U	2600 U	1400 J	5500
Phenol	380 U	2100 U	2100 U	400 U	2600 U	5500 U	3900 U
Pyrene	380 U	2300	800 J	46 J	440 J	3000 J	11000

SURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-00	4-HA02-00	4-HA02-00D	4-HA03-00	4-HA04-00	4-HA05-00	4-HA06-00
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Pesticides/PCBs (ug/kg)							
4,4'-DDD	3.8 U	4.2 U	4.2 U	4 U	5.2 U	27 U	7.6 K
4,4'-DDE	3.8 U	9.6 J	4.2 U	4 U	43 J	27 U	3.9 U
4,4'-DDT	3.8 U	7 J	4.6 J	4 U	9.4	220 K	18 K
Aldrin	2 U	2.1 U	2.2 U	2.1 U	2.7 U	33 K	2 U
Aroclor-1016	38 U	42 U	42 U	40 U	52 U	270 U	39 U
Aroclor-1221	77 U	85 U	85 U	82 U	110 U	560 U	79 U
Aroclor-1232	38 U	42 U	42 U	40 U	52 U	270 U	39 U
Aroclor-1242	38 U	42 U	42 U	40 U	52 U	1000 K	39 U
Aroclor-1248	38 U	42 U	42 U	40 U	52 U	270 U	39 U
Aroclor-1254	38 U	42 U	42 U	40 U	52 U	270 U	39 U
Aroclor-1260	53	64 J	75 J	53 J	600 J	2700 K	91 K
alpha-BHC	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
beta-BHC	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
delta-BHC	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
gamma-BHC	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
alpha-Chlordane	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
gamma-Chlordane	2 U	2.1 U	2.2 U	2.1 U	2.7 U	15 K	2 U
Dieldrin	3.8 U	4.2 U	4.2 U	4 U	5.2 U	27 U	3.9 U
Endosulfan I	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
Endosulfan II	4.4 J	4.2 U	4.2 U	5.7 J	5.2 U	27 U	3.9 U
Endosulfan Sulfate	3.8 U	4.2 U	4.2 U	4 U	5.2 U	27 U	3.9 U
Endrin	6.3 J	4.2 U	4.2 U	4 U	5.2 U	28 K	3.9 U
Endrin Aldehyde	3.8 U	4.2 U	4.2 U	4 U	5.2 U	77 K	3.9 U
Endrin Ketone	3.8 U	4.2 U	4.5	4 U	5.2 U	87 K	3.9 U
Heptachlor	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
Heptachlor Epoxide	2 U	2.1 U	2.2 U	2.1 U	2.7 U	14 U	2 U
Methoxychlor	20 U	21 U	22 U	21 U	27 U	140 U	20 U
Toxaphene	200 U	210 U	220 U	210 U	270 U	1400 U	200 U

SURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-00	4-HA02-00	4-HA02-00D	4-HA03-00	4-HA04-00	4-HA05-00	4-HA06-00
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Explosives (ug/kg)							
1,3,5-Trinitrobenzene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
1,3-Dinitrobenzene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
2,4,6-Trinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
2,4-Dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
2,6-Dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
2-Amino-4,6-dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
4-Amino-2,6-dinitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
2-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
3-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
4-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
HMX	500 U	500 U	500 U	450 U	450 U	500 U	480 U
Nitrobenzene	500 U	500 U	500 U	450 U	450 U	500 U	480 U
RDX	500 U	500 U	500 U	450 U	450 U	500 U	480 U
Tetryl	500 U	500 U	500 U	450 U	450 U	500 U	480 U

SURFACE SOIL - INORGANIC CONSTITUENTS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-00 11/12/1999	4-HA02-00 11/12/1999	4-HA02-00D 11/12/1999	4-HA03-00 11/12/1999	4-HA04-00 11/12/1999	4-HA05-00 11/12/1999	4-HA06-00 11/12/1999
Inorganics (mg/kg)							
Aluminum	4560 L	5810 L	7160 L	6760 L	9560 L	6260 L	6320 L
Antimony	0.49 U	0.46 U	0.55 U	0.47 U	0.67 J	12.6	0.44 UJ
Arsenic	2.9 L	2.7 L	2.6 L	3 L	4.1 L	3.5 L	2.7 L
Barium	20.3 J	36.6 J	27.1 J	25.5 J	164	68	101 J
Beryllium	0.33 B	0.64 B	0.36 B	0.35 B	0.68 B	0.65 B	0.32 B
Cadmium	0.08 U	0.07 U	0.08 U	0.07 U	0.74 J	3.3	0.34 U
Calcium	3750	1440	1110 J	8420	7320	6670	2940
Chromium	9.4	8.7	9.6	11.8	16.9	19	56.6
Cobalt	1.4 U	2.8 J	3.7 J	1.7 J	4.1 J	4.6 J	8.8 J
Copper	4.5 B	10.5	12	3.8 B	26	150	77.8 J
Cyanide	0.02 UL	0.12 L	0.13 L	0.02 UL	0.03 UL	0.11 L	0.07 L
Iron	8900 L	9840 L	8570 L	8910 L	14600 L	14300 L	61700 L
Lead	12.8	22.7	24	11.6	39.5	129	105 J
Magnesium	619 J	514 J	669 J	800 J	1110 J	2010	2140
Manganese	48.7	233	127	43.2	151	175	302 J
Mercury	0.04 J	0.31	0.36	0.09 J	0.76	0.88	0.06 J
Nickel	2.2 B	3.8 B	4.1 B	4 B	10.1 J	12.1	39.6
Potassium	789 J	283 B	366 J	928 J	798 J	1420	961 J
Selenium	0.67 U	0.63 U	0.75 U	0.64 U	1 J	0.81 U	0.6 U
Silver	2.8 B	2.6 B	3 B	2.4 B	5.2 B	5.2 B	20.6 L
Sodium	24.4 B	23.1 B	22.6 B	72.9 B	73.8 B	60.5 B	73.1 B
Thallium	0.54 UL	0.5 UL	0.6 UL	0.51 UL	0.72 UL	0.65 UL	1.1 L
Vanadium	13.9	13.9	15.1	16.6	22.2	23.5	35.7 J
Zinc	28.6 B	106	102	32.5 B	273	324	122 J

SUBSURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-02	4-HA01-02D	4-HA02-02	4-HA03-02	4-HA04-01	4-HA05-01	4-HA06-02
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Volatiles (ug/kg)							
1,1,1-Trichloroethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
1,1,2,2-Tetrachloroethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 UL
1,1,2-Trichloroethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
1,1-Dichloroethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
1,1-Dichloroethene	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
1,2-Dichloroethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
1,2-Dichloroethene (total)	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
1,2-Dichloropropane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
cis-1,3-Dichloropropene	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
trans-1,3-Dichloropropene	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
2-Butanone	10.93 U	2 B	8 J	14.17 U	20.41 U	13.04 U	12.75 U
2-Hexanone	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 UL
4-Methyl-2-Pentanone	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Acetone	10.93 U	3 B	43 B	14.17 U	20.41 U	13.04 U	12.75 U
Benzene	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Bromodichloromethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Bromoform	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Bromomethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Carbon Disulfide	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Carbon Tetrachloride	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Chlorobenzene	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 UL
Chloroethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Chloroform	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Chloromethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Dibromochloromethane	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Ethylbenzene	10.93 U	11.36 U	2 J	14.17 U	20.41 U	13.04 U	12.75 UL
Methylene Chloride	7 B	7 B	7 B	17 B	13 B	12 B	20 B
Styrene	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 UL
Tetrachloroethene	10.93 U	11.36 U	13.72 U	3 J	20.41 U	13.04 U	12.75 UL
Toluene	3 J	2 J	13.72 U	14.17 U	20.41 U	13.04 U	12.75 UL
Trichloroethene	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Vinyl Chloride	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 U
Xylene (Total)	10.93 U	11.36 U	13.72 U	14.17 U	20.41 U	13.04 U	12.75 UL

SUBSURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-02 11/12/1999	4-HA01-02D 11/12/1999	4-HA02-02 11/12/1999	4-HA03-02 11/12/1999	4-HA04-01 11/12/1999	4-HA05-01 11/12/1999	4-HA06-02 11/12/1999
Semivolatiles (ug/kg)							
1,2,4-Trichlorobenzene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
1,2-Dichlorobenzene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
1,3-Dichlorobenzene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
1,4-Dichlorobenzene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2,2'-oxybis(1-Chloropropane)	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2,4,5-Trichlorophenol	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
2,4,6-Trichlorophenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2,4-Dichlorophenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2,4-Dimethylphenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2,4-Dinitrophenol	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
2,4-Dinitrotoluene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2,6-Dinitrotoluene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2-Chloronaphthalene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2-Chlorophenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2-Methylnaphthalene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2-Methylphenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
2-Nitroaniline	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
2-Nitrophenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
3,3'-Dichlorobenzidine	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
3-Nitroaniline	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
4,6-Dinitro-2-Methylphenol	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
4-Bromophenyl phenylether	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
4-Chloro-3-Methylphenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
4-Chloroaniline	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
4-Chlorophenyl-phenylether	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
4-Methylphenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
4-Nitroaniline	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
4-Nitrophenol	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
Acenaphthene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Acenaphthylene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Anthracene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Benzo(a)Anthracene	370 U	370 U	77 J	11000 UJ	17000 UJ	4300 U	500 J
Benzo(a)Pyrene	370 U	52 J	110 J	11000 UJ	17000 UJ	550 J	600 J

SUBSURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-02	4-HA01-02D	4-HA02-02	4-HA03-02	4-HA04-01	4-HA05-01	4-HA06-02
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Semivolatiles (ug/kg) (Cont)							
Benzo(b)Fluoranthene	51 J	89 J	130 J	11000 UJ	17000 UJ	510 J	490 J
Benzo(g,h,i)Perylene	43 J	44 J	79 J	11000 UJ	17000 UJ	4300 U	440 J
Benzo(k)Fluoanthene	370 U	59 J	64 J	11000 UJ	17000 UJ	490 J	760 J
Bis(2-chloroethoxy)Methane	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Bis(2-chloroethyl)Ether	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Bis(2-Ethylhexyl)Phthalate	650	530	670	63000 J	2600 B	4300 U	3800 U
Butylbenzylphthalate	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Carbazole	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Chrysene	45 J	69 J	130 J	11000 UJ	17000 UJ	4300 U	620 J
Dibenz(a,h)Anthracene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Dibenzofuran	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Diethylphthalate	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Dimethyl Phthalate	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Di-n-Butylphthalate	370 U	370 U	66 B	5700 B	90000 J	4300 U	3800 U
Di-n-Octyl Phthalate	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Fluoranthene	43 J	57 J	160 J	11000 UJ	17000 UJ	880 J	880 J
Fluorene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Hexachlorobenzene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Hexachlorobutadiene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Hexachlorocyclopentadiene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Hexachloroethane	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Indeno(1,2,3-cd)Pyrene	39 J	48 J	66 J	11000 UJ	17000 UJ	4300 U	3800 U
Isophorone	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Naphthalene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Nitrobenzene	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
N-Nitroso-Di-n-Propylamine	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
N-Nitrosodiphenylamine	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Pentachlorophenol	930 U	940 U	1200 U	29000 UJ	42000 UJ	11000 U	9500 U
Phenanthrene	370 U	370 U	100 J	11000 UJ	17000 UJ	4300 U	400 J
Phenol	370 U	370 U	480 U	11000 UJ	17000 UJ	4300 U	3800 U
Pyrene	44 J	59 J	210 J	11000 UJ	17000 UJ	930 J	670 J

SUBSURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
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NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-02	4-HA01-02D	4-HA02-02	4-HA03-02	4-HA04-01	4-HA05-01	4-HA06-02
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Pesticides/PCBs (ug/kg)							
4,4'-DDD	3.7 U	3.7 U	4.5 L	4.6 U	6.7 U	4.3 U	3.8 U
4,4'-DDE	3.7 U	3.7 U	5.3	4.6 U	24 J	10 J	3.8 U
4,4'-DDT	3.7 U	3.7 U	5.8	4.6 U	13 J	150 L	8.4 J
Aldrin	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	27 J	1.9 U
Aroclor-1016	37 U	37 U	48 UL	46 U	67 U	43 U	38 U
Aroclor-1221	75 U	76 U	97 UL	93 U	140 U	87 U	76 U
Aroclor-1232	37 U	37 U	48 UL	46 U	67 U	43 U	38 U
Aroclor-1242	37 U	37 U	48 UL	46 U	67 U	2300 L	38 U
Aroclor-1248	37 U	37 U	48 UL	46 U	67 U	43 U	38 U
Aroclor-1254	39	49	48 UL	46 U	67 U	43 U	38 U
Aroclor-1260	50 J	76 J	48 UL	51 K	330 J	1600 L	38 U
alpha-BHC	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U
beta-BHC	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U
delta-BHC	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U
gamma-BHC	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U
alpha-Chlordane	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	2.4 J	1.9 U
gamma-Chlordane	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	4.3 J	1.9 U
Dieldrin	3.7 U	3.7 U	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U
Endosulfan I	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U
Endosulfan II	11 J	14 J	4.8 UL	6.5 K	6.7 U	4.3 U	3.8 U
Endosulfan Sulfate	3.7 U	3.7 U	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U
Endrin	3.7 U	3.7 U	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U
Endrin Aldehyde	3.7 U	3.7 U	4.8 UL	4.6 U	6.7 U	4.3 U	3.8 U
Endrin Ketone	3.7 U	3.7 U	4.8 UL	4.6 U	8.9 J	19 J	3.8 U
Heptachlor	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	9.9 J	1.9 U
Heptachlor Epoxide	1.9 U	1.9 U	2.5 UL	2.4 U	3.4 U	2.2 U	1.9 U
Methoxychlor	19 U	19 U	25 UL	24 U	34 U	25 J	19 U
Toxaphene	190 U	190 U	250 UL	240 U	340 U	220 U	190 U

SUBSURFACE SOIL - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
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NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
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	4-HA01-02	4-HA01-02D	4-HA02-02	4-HA03-02	4-HA04-01	4-HA05-01	4-HA06-02
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Explosives (ug/kg)							
1,3,5-Trinitrobenzene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
1,3-Dinitrobenzene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
2,4,6-Trinitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
2,4-Dinitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
2,6-Dinitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
2-Amino-4,6-dinitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
4-Amino-2,6-dinitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
2-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
3-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
4-Nitrotoluene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
HMX	500 U	500 U	500 U	450 U	450 U	450 U	480 U
Nitrobenzene	500 U	500 U	500 U	450 U	450 U	450 U	480 U
RDX	500 U	500 U	500 U	450 U	450 U	450 U	480 U
Tetryl	500 U	500 U	500 U	450 U	450 U	450 U	480 U

SUBSURFACE SOIL - INORGANIC CONSTITUENTS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-HA01-02	4-HA01-02D	4-HA02-02	4-HA03-02	4-HA04-01	4-HA05-01	4-HA06-02
	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999	11/12/1999
Inorganics (mg/kg)							
Aluminum	8440 L	7450 L	3670 L	9660 L	7520 L	5850 L	3550 L
Antimony	0.46 U	0.44 U	0.53 U	0.53 U	0.69 U	1.1	1.1
Arsenic	2.7 L	2.2 L	1.8 L	2.9 L	3.9 L	3.7 L	4.2 L
Barium	34.2 J	29.5 J	20.2 J	48 J	247	30.6 J	33.2 J
Beryllium	0.47 B	0.38 B	0.31 B	0.39 B	0.4 B	0.55 B	0.35 B
Cadmium	0.07 U	0.07 U	0.08 U	0.08 U	0.96 J	1.2 J	0.15 U
Calcium	2940	3140	478 J	4060	5970	3240	2460
Chromium	11.5	12	6.9	15.9	13.4	17.4	29.2
Cobalt	1.9 J	2 J	1.6 J	4.3 J	3.8 J	2.8 J	3.6 J
Copper	9	4.6 B	4.4 B	40.4	30	30.1	19.4
Cyanide	0.02 UL	0.02 UL	0.03 UL	0.03 UL	0.44 L	0.03 UL	0.02 UL
Iron	8260 L	8660 L	4960 L	19300 L	12100 L	12700 L	28000 L
Lead	15.8	14.5	11.3	45.3	42.3	36.2	29.7
Magnesium	606 J	538 J	327 J	499 J	812 J	1310 J	1730
Manganese	49.1	71.3	28.3	120	105	40.4	114
Mercury	0.08 J	0.09 J	0.1 J	0.91	0.9	0.44	0.05 J
Nickel	3.4 B	3.2 B	3.5 B	17.3	13.6	7.7 B	20.4
Potassium	640 J	554 J	249 B	566 J	531 J	1700	920
Selenium	0.62 U	0.6 U	0.78 J	0.72 U	0.94 U	0.79 U	0.66 U
Silver	2.3 B	2.9 B	1.6 B	5.8 B	3.9 B	3.7 B	8.5 L
Sodium	36.8 B	22.3 B	11.6 B	37.4 B	57.1 B	48.7 B	31 B
Thallium	0.5 UL	0.48 UL	0.58 UL	0.58 UL	0.75 UL	0.63 UL	0.53 UL
Vanadium	16.2	17.8	10.1 B	12.2	17.1	20.5	20.8
Zinc	643	198	28.6 B	334	373	150	236

SEDIMENT - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
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	4-SD02-00	4-SD02-01	4-SD03-00	4-SD03-01	4-SD04-00	4-SD04-00D	4-SD04-01	4-SED01-00	4-SED01-01
	11/14/1999	11/14/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/12/1999	11/12/1999
Volatiles (ug/kg)									
1,1,1-Trichloroethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
1,1,2,2-Tetrachloroethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
1,1,2-Trichloroethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
1,1-Dichloroethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
1,1-Dichloroethene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
1,2-Dichloroethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
1,2-Dichloroethene (total)	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
1,2-Dichloropropane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
cis-1,3-Dichloropropene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
trans-1,3-Dichloropropene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
2-Butanone	15 B	14.88 U	17.53 U	13.89 U	10 B	12 B	15.98 U	12 J	7 B
2-Hexanone	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
4-Methyl-2-Pentanone	20.49 UL	14.88 U	17.53 U	2 J	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Acetone	44 B	27 B	17 B	24 B	23 B	36 B	22 B	37 B	26 B
Benzene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Bromodichloromethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Bromoform	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Bromomethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Carbon Disulfide	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Carbon Tetrachloride	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Chlorobenzene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Chloroethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Chloroform	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Chloromethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Dibromochloromethane	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Ethylbenzene	20.49 UL	14.88 U	17.53 U	13.89 U	3 J	26.4 U	15.98 U	2 J	16.9 U
Methylene Chloride	18 B	16 B	39 B	36 B	12 B	15 B	36 B	24 B	21 B
Styrene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Tetrachloroethene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Toluene	3 L	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Trichloroethene	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Vinyl Chloride	20.49 UL	14.88 U	17.53 U	13.89 U	19.85 U	26.4 U	15.98 U	15.81 U	16.9 U
Xylene (Total)	20.49 UL	14.88 U	17.53 U	13.89 U	10 J	26.4 U	15.98 U	15.81 U	16.9 U

SEDIMENT - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-SD02-00	4-SD02-01	4-SD03-00	4-SD03-01	4-SD04-00	4-SD04-00D	4-SD04-01	4-SED01-00	4-SED01-01
	11/14/1999	11/14/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/12/1999	11/12/1999
Semivolatiles (ug/kg)									
1,2,4-Trichlorobenzene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
1,2-Dichlorobenzene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
1,3-Dichlorobenzene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
1,4-Dichlorobenzene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2,2'-oxybis(1-Chloropropan	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2,4,5-Trichlorophenol	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
2,4,6-Trichlorophenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2,4-Dichlorophenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2,4-Dimethylphenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2,4-Dinitrophenol	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
2,4-Dinitrotoluene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2,6-Dinitrotoluene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2-Chloronaphthalene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2-Chlorophenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2-Methylnaphthalene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2-Methylphenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
2-Nitroaniline	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
2-Nitrophenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
3,3'-Dichlorobenzidine	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
3-Nitroaniline	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
4,6-Dinitro-2-Methylphenol	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
4-Bromophenyl phenylether	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
4-Chloro-3-Methylphenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
4-Chloroaniline	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
4-Chlorophenyl-phenylether	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
4-Methylphenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
4-Nitroaniline	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
4-Nitrophenol	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
Acenaphthene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Acenaphthylene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Anthracene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Benzo(a)Anthracene	260 J	230 J	170 J	410 U	290 J	270 J	110 J	140 J	150 J
Benzo(a)Pyrene	260 J	240 J	170 J	410 U	330 J	340 J	130 J	160 J	110 J

SEDIMENT - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
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	4-SD02-00	4-SD02-01	4-SD03-00	4-SD03-01	4-SD04-00	4-SD04-00D	4-SD04-01	4-SED01-00	4-SED01-01
	11/14/1999	11/14/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/12/1999	11/12/1999
Semivolatiles (ug/kg) (Cont)									
Benzo(b)Fluoranthene	370 J	330 J	330 J	57 J	450 J	550 J	210 J	220 J	100 J
Benzo(g,h,i)Perylene	130 J	100 J	84 J	410 U	1200 U	180 J	60 J	56 J	600 U
Benzo(k)Fluoanthene	290 J	280 J	170 J	410 U	420 J	440 J	130 J	120 J	86 J
Bis(2-chloroethoxy)Methane	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Bis(2-chloroethyl)Ether	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Bis(2-Ethylhexyl)Phthalate	170 J	79 J	160 J	68 J	140 J	280 J	78 J	110 J	120 J
Butylbenzylphthalate	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Carbazole	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Chrysene	400 J	330 J	240 J	52 J	460 J	490 J	160 J	190 J	180 J
Dibenz(a,h)Anthracene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Dibenzofuran	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Diethylphthalate	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Dimethyl Phthalate	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Di-n-Butylphthalate	1200 U	62 J	81 J	410 U	1200 U	1600 U	84 J	64 J	61 J
Di-n-Octyl Phthalate	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Fluoranthene	640 J	520	410 J	87 J	600 J	580 J	250 J	260 J	230 J
Fluorene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Hexachlorobenzene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Hexachlorobutadiene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Hexachlorocyclopentadiene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Hexachloroethane	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Indeno(1,2,3-cd)Pyrene	160 J	120 J	95 J	410 U	1200 U	210 J	64 J	550 U	600 U
Isophorone	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Naphthalene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Nitrobenzene	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
N-Nitroso-Di-n-Propylamine	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
N-Nitrosodiphenylamine	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Pentachlorophenol	3100 U	1200 U	1300 U	1000 U	3000 U	4000 U	1200 U	1400 U	1500 U
Phenanthrene	330 J	240 J	210 J	410 U	340 J	330 J	140 J	120 J	100 J
Phenol	1200 U	470 U	530 U	410 U	1200 U	1600 U	490 U	550 U	600 U
Pyrene	570 J	470	350 J	84 J	610 J	590 J	250 J	230 J	250 J

SEDIMENT - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
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	4-SD02-00 11/14/1999	4-SD02-01 11/14/1999	4-SD03-00 11/13/1999	4-SD03-01 11/13/1999	4-SD04-00 11/13/1999	4-SD04-00D 11/13/1999	4-SD04-01 11/13/1999	4-SED01-00 11/12/1999	4-SED01-01 11/12/1999
Pesticides/PCBs (ug/kg)									
4,4'-DDD	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
4,4'-DDE	6 UL	4.6 U	5.2 U	4.1 U	9 L	7.8 UL	4.9 UL	5.5 U	6.6
4,4'-DDT	6 UL	49 J	5.2 U	400	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
Aldrin	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
Aroclor-1016	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	55 U	60 U
Aroclor-1221	120 UL	94 U	110 U	82 U	120 UL	160 UL	99 UL	110 U	120 U
Aroclor-1232	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	55 U	60 U
Aroclor-1242	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	55 U	60 U
Aroclor-1248	60 UL	33 J	52 U	41 U	19 L	78 UL	49 UL	55 U	60 U
Aroclor-1254	60 UL	46 U	52 U	41 U	60 UL	78 UL	49 UL	55 U	60 U
Aroclor-1260	91 L	210	52 U	170	240 L	25	18	270 K	60 U
alpha-BHC	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
beta-BHC	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
delta-BHC	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
gamma-BHC	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
alpha-Chlordane	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
gamma-Chlordane	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
Dieldrin	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
Endosulfan I	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
Endosulfan II	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
Endosulfan Sulfate	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
Endrin	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
Endrin Aldehyde	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
Endrin Ketone	6 UL	4.6 U	5.2 U	4.1 U	6 UL	7.8 UL	4.9 UL	5.5 U	6 U
Heptachlor	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
Heptachlor Epoxide	3.1 UL	2.4 U	2.7 U	2.1 U	3.1 UL	4 UL	2.5 UL	2.8 U	3.1 U
Methoxychlor	31 UL	24 U	27 U	21 U	31 UL	40 UL	25 UL	28 U	31 U
Toxaphene	310 UL	240 U	270 U	210 U	310 UL	400 UL	250 UL	280 U	310 U

SEDIMENT - ORGANIC COMPOUNDS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
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NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
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	4-SD02-00	4-SD02-01	4-SD03-00	4-SD03-01	4-SD04-00	4-SD04-00D	4-SD04-01	4-SED01-00	4-SED01-01
	11/14/1999	11/14/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/12/1999	11/12/1999
Explosives (ug/kg)									
1,3,5-Trinitrobenzene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
1,3-Dinitrobenzene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
2,4,6-Trinitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
2,4-Dinitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
2,6-Dinitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
2-Amino-4,6-dinitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
4-Amino-2,6-dinitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
2-Nitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
3-Nitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
4-Nitrotoluene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
HMX	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
Nitrobenzene	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
RDX	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U
Tetryl	480 U	430 U	480 U	450 U	480 U	500 U	450 U	480 U	430 U

SEDIMENT - INORGANIC CONSTITUENTS
SITE 4 - MEDICAL SUPPLIES DISPOSAL AREA
SITE INSPECTION REPORT
NAVAL WEAPONS STATION YORKTOWN, YORKTOWN, VIRGINIA
CHEATHAM ANNEX SITE

	4-SD02-00	4-SD02-01	4-SD03-00	4-SD03-01	4-SD04-00	4-SD04-00D	4-SD04-01	4-SED01-00	4-SED01-01
	11/14/1999	11/14/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/13/1999	11/12/1999	11/12/1999
Inorganics (mg/kg)									
Aluminum	6070 L	2780 L	5950 L	1500 L	4210 L	4070 L	3370 L	8340 L	5120 L
Antimony	0.67 U	0.48 U	0.62 U	0.43 U	0.65 U	0.65 U	0.55 U	1.7 B	1 J
Arsenic	4.5	1.9 J	3.2	0.98 J	8.8	7.2	9.5	12.2 L	11.2
Barium	27.1 J	9.9 B	24.9 J	6.4 B	27.5 J	23.6 J	19.2 J	71.7 J	39.2 J
Beryllium	0.56 J	0.27 J	0.6 J	0.21 J	0.36 J	0.22 J	0.31 J	0.73 B	0.49 B
Cadmium	3.2	0.15 J	2.9	0.85 J	0.79 J	0.52 J	0.09 J	5.7	7.2
Calcium	4550 J	1670 J	3380 J	1360 J	4310 J	3400 J	15200 J	25200	7010
Chromium	17.9	9.3	17.2	7.7	9.5	7.7	7	35.8	25
Cobalt	3.9 J	1.3 U	2.9 J	1.2 U	1.8 U	1.8 U	1.5 U	4.6 J	3.1 J
Copper	62.7 J	3.8 B	65.3 J	7.3 B	33.5 J	21.2 J	5.1 B	30.7	10.1
Cyanide	0.04 UL	0.03 UL	0.03 UL	0.02 UL	0.04 UL	0.04 UL	0.03 UL	0.04 UL	0.04 UL
Iron	14300 L	7840 L	14100	4540 L	9410 L	8490 L	4950 L	15400	9040
Lead	24.6	4.2	20.3	5.4	20.6	16	10.9	52.3	59.8
Magnesium	1730	859 J	1780	597 J	1070 J	912 J	410 J	2790	2000
Manganese	93.4	14.5	74.9	12.1	72.7	60	36	62	26.8
Mercury	0.04 UL	0.02 UL	0.03 UL	0.03 UL	0.04 UL	0.04 L	0.03 UL	0.07 J	0.04 U
Nickel	7.9 J	1.7 J	7.3 J	2 J	5 J	4.5 J	2.3 J	23.6	18.3
Potassium	1290 J	1440	1550	911 J	352 B	368 B	272 B	1210 J	673 J
Selenium	0.91 U	0.65 U	0.84 U	0.59 U	0.89 U	0.88 U	0.75 U	1.1 U	1 U
Silver	5.1 B	2.3 B	3.9 B	1.5 B	2.8 B	2 B	0.97 U	5.6 B	2.1 B
Sodium	118 B	57 J	101 B	59.2 B	73.6 B	80.3 B	64.3 B	191 B	65.2 B
Thallium	0.73 UL	0.52 UL	0.67 UL	0.47 UL	0.71 UL	0.71 UL	0.6 UL	0.91 UL	0.81 UL
Vanadium	21.9	9.6 J	21.1	6.8 J	15.1	13.2 J	9.8 J	36.6	25.4
Zinc	145	30.2 B	130	44.4 B	228	180	307	147	87.6 B

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Station ID	CAS09-GW01	CAS09-GW02	CAS09-GW03		CAS09-GW04
Sample ID	CAS09-GW01-1109	CAS09-GW02-1109	CAS09-GW03-1109	CAS09-GW03P-1109	CAS09-GW04-1109
Sample Date	11/02/09	11/04/09	11/04/09	11/04/09	11/03/09
Chemical Name					
Volatile Organic Compounds (UG/L)					
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	2 U	2 U	2 U	2 U	2 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	1 UL	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	2 U	2 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	2 U	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U	5 U
2-Hexanone	6 U	6 U	6 U	6 U	6 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U	5 U
Acetone	3 B	7 U	4 B	5 B	7 U
Benzene	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U	1 U
Bromomethane	2 U	2 U	2 U	2 U	2 U
Carbon disulfide	0.7 B	0.4 B	0.6 B	0.4 B	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	1 U	1 U	1 U	1 U	1 U
Chloroethane	2 U	2 U	2 U	2 U	2 U
Chloroform	1 U	1 U	1 U	1 U	1 U
Chloromethane	2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Cyclohexane	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon-12)	2 U	2 U	2 U	2 U	2 U
Ethylbenzene	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	1 U	1 U	1 U	1 U	1 U
m- and p-Xylene	2 U	2 U	2 U	2 U	2 U
Methyl acetate	2 U	2 U	2 U	2 U	2 U
Methylcyclohexane	1 U	1 U	1 U	1 U	1 U
Methylene chloride	5 U	5 U	5 U	5 U	5 U
Methyl-tert-butyl ether (MTBE)	2 U	2 U	2 U	2 U	2 U
o-Xylene	1 U	1 U	1 U	1 U	1 U
Styrene	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	3 U	3 U	3 U	3 U	3 U
Toluene	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane(Freon-11)	2 U	2 U	2 U	2 U	2 U
Vinyl chloride	2 U	2 U	2 U	2 U	2 U
Xylene, total	3 U	3 U	3 U	3 U	3 U
Semivolatile Organic Compounds (UG/L)					
1,1-Biphenyl	10 U	10 U	10 U	10 U	10 U
1,2,4,5-Tetrachlorobenzene	10 U	10 U	10 U	10 U	10 U
2,2'-Oxybis(1-chloropropane)	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	24 U	25 U	25 U	26 U	26 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	13 U	14 U	14 U	14 U	14 U
2,4-Dinitrophenol	24 U	25 U	25 U	26 U	26 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
2-Methylphenol	12 U	12 U	12 U	12 U	12 U
2-Nitroaniline	24 U	25 U	25 U	26 U	26 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U
3- and 4-Methylphenol	16 U	17 U	17 U	17 U	18 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	24 U	25 U	25 U	26 U	26 U
4,6-Dinitro-2-methylphenol	24 U	25 U	25 U	26 U	26 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	10 U	11 U	11 U	11 U	11 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	24 U	25 U	25 U	26 U	26 U

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Station ID	CAS09-GW01	CAS09-GW02	CAS09-GW03		CAS09-GW04
Sample ID	CAS09-GW01-1109	CAS09-GW02-1109	CAS09-GW03-1109	CAS09-GW03P-1109	CAS09-GW04-1109
Sample Date	11/02/09	11/04/09	11/04/09	11/04/09	11/03/09
Chemical Name					
4-Nitrophenol	24 U	25 U	25 U	26 U	26 U
Acenaphthene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Acenaphthylene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Acetophenone	12 U	12 U	12 U	12 U	12 U
Anthracene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Atrazine	10 UJ	10 U	10 U	10 U	10 U
Benzaldehyde	10 UJ	10 U	10 U	10 U	10 R
Benzo(a)anthracene	0.19 U	0.2 U	0.14 J	0.16 J	0.21 U
Benzo(a)pyrene	0.19 U	0.2 U	0.11 J	0.2 U	0.21 U
Benzo(b)fluoranthene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Benzo(g,h,i)perylene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Benzo(k)fluoranthene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
bis(2-Chloroethoxy)methane	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	0.96 U	1 U	0.99 U	1 U	1 UL
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U
Caprolactam	10 UL	10 U	10 U	10 U	10 U
Carbazole	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Chrysene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Dibenz(a,h)anthracene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U
Dimethyl phthalate	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	0.96 U	1 U	0.99 U	1 U	1 U
Di-n-octylphthalate	10 U	10 U	10 U	10 U	10 U
Fluoranthene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Fluorene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Hexachlorobenzene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Indeno(1,2,3-cd)pyrene	0.19 U	0.2 U	0.21 B	0.2 U	0.21 U
Isophorone	10 U	10 U	10 U	10 U	10 U
Naphthalene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
n-Nitroso-di-n-propylamine	10 U	10 U	10 U	10 U	10 U
n-Nitrosodiphenylamine	12 U	12 U	12 U	12 U	12 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	0.96 UL	1 U	0.99 U	1 U	1 U
Phenanthrene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 UL
Phenol	10 U	10 U	10 U	10 U	10 U
Pyrene	0.19 U	0.2 U	0.2 U	0.2 U	0.21 U
Pesticide/Polychlorinated Biphenyls (UG/L)					
4,4'-DDD	0.094 U	0.1 U	0.11 U	0.11 U	0.12 J
4,4'-DDE	0.094 U	0.1 U	0.11 U	0.11 U	0.038 J
4,4'-DDT	0.094 U	0.1 U	0.11 U	0.11 U	0.095 U
Aldrin	0.047 U	0.053 U	0.057 U	0.054 U	0.048 U
alpha-BHC	0.047 U	0.053 U	0.057 U	0.054 U	0.048 U
alpha-Chlordane	0.047 U	0.053 U	0.057 U	0.054 U	0.036 J
Aroclor-1016	0.48 U	0.53 U	0.57 U	0.54 U	0.48 U
Aroclor-1221	0.67 U	0.74 U	0.8 U	0.75 U	0.67 U
Aroclor-1232	0.48 U	0.53 U	0.57 U	0.54 U	0.48 U
Aroclor-1242	0.58 U	0.63 U	0.68 U	0.64 U	0.57 U
Aroclor-1248	0.67 U	0.74 U	0.8 U	0.75 U	0.67 U
Aroclor-1254	0.48 U	0.53 U	0.57 U	0.54 U	0.48 U
Aroclor-1260	0.58 U	0.63 U	0.68 U	0.64 U	0.57 U
beta-BHC	0.047 U	0.053 U	0.057 U	0.054 U	0.048 U
delta-BHC	0.047 U	0.053 U	0.057 U	0.054 U	0.048 U
Dieldrin	0.094 U	0.1 U	0.11 U	0.11 U	0.095 U
Endosulfan I	0.047 U	0.053 U	0.057 U	0.054 U	0.036 J
Endosulfan II	0.094 U	0.1 U	0.11 U	0.11 U	0.025 J
Endosulfan sulfate	0.094 U	0.1 U	0.11 U	0.11 U	0.095 U
Endrin	0.094 U	0.1 U	0.11 U	0.11 U	0.095 U
Endrin aldehyde	0.094 U	0.1 U	0.11 U	0.11 U	0.095 U
Endrin ketone	0.094 U	0.1 U	0.11 U	0.11 U	0.071 J
gamma-BHC (Lindane)	0.047 U	0.053 U	0.057 U	0.054 U	0.048 U
gamma-Chlordane	0.047 U	0.053 U	0.057 U	0.054 U	0.048
Heptachlor	0.047 U	0.053 U	0.057 U	0.054 U	0.048 U
Heptachlor epoxide	0.047 U	0.053 U	0.057 U	0.054 U	0.048 U
Methoxychlor	0.47 U	0.53 U	0.57 U	0.54 U	0.48 U
Toxaphene	0.94 U	1 U	1.1 U	1.1 U	0.95 U
Total Metals (UG/L)					
Aluminum	2,820	233 J	279 J	350	133 J
Antimony	0.57 J	0.82 J	1.1	0.95 J	0.29 J
Arsenic	5 U	2 J	5 U	1.9 J	5 U
Barium	57.6	41.3	32.9	30.4	33.9
Beryllium	0.16 J	1 U	1 U	1 U	1 U
Cadmium	0.08 J	0.23 J	0.12 J	0.14 J	0.08 J

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Station ID	CAS09-GW01	CAS09-GW02	CAS09-GW03		CAS09-GW04
Sample ID	CAS09-GW01-1109	CAS09-GW02-1109	CAS09-GW03-1109	CAS09-GW03P-1109	CAS09-GW04-1109
Sample Date	11/02/09	11/04/09	11/04/09	11/04/09	11/03/09
Chemical Name					
Calcium	145,000	140,000	142,000	136,000	143,000
Chromium	5.1 J	0.95 J	1.2 J	1.6 J	15 U
Cobalt	0.73 J	30 U	0.35 J	30 U	30 U
Copper	25	2.3 J	2.6 J	3.7 J	1.6 J
Cyanide	12 U	12 U	12 U	12 U	12 U
Iron	5,050	836	608	687	2,480
Lead	4.3 J	1.2 J	2.5 J	2.3 J	2.1 J
Magnesium	2,330	2,670	1,920	1,760	1,790
Manganese	113	95	51.7	35.8	76.3
Mercury	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	2.8 J	3.4 J	2.5 J	2.5 J	0.32 J
Potassium	1,610	2,230	1,090	1,040	1,040
Selenium	3.2 J	3.3 J	10 U	10 U	10 U
Silver	15 U	15 U	15 U	15 U	15 U
Sodium	6,820	7,970	5,270	4,700	8,720
Thallium	0.19 B	0.31 B	0.13 B	0.69 B	0.62 B
Vanadium	5.7 J	25 U	25 U	25 U	25 U
Zinc	15.8 J	4.6 J	2.3 J	3.4 J	2 J
Dissolved Metals (UG/L)					
Aluminum, Dissolved	168 J	60.3 B	53.4 B	54.2 B	55.9 B
Antimony, Dissolved	0.54 J	0.82 J	1	0.61 J	0.21 J
Arsenic, Dissolved	5 U	5 U	5 U	5 U	5 U
Barium, Dissolved	43.9	43	32.9	29.4	33.3
Beryllium, Dissolved	1 U	1 U	1 U	1 U	1 U
Cadmium, Dissolved	1 U	0.17 J	0.11 J	0.11 J	1 U
Calcium, Dissolved	140,000	145,000	140,000	131,000	143,000
Chromium, Dissolved	0.86 J	15 U	0.54 J	15 U	15 U
Cobalt, Dissolved	30 U	0.43 J	0.47 J	30 U	30 U
Copper, Dissolved	25 U	25 U	0.77 J	2.2 J	25 U
Iron, Dissolved	2,220	635	204	109	2,220
Lead, Dissolved	5 U	5 U	5 U	5 U	5 U
Magnesium, Dissolved	2,090	2,620	1,900	1,620	1,760
Manganese, Dissolved	84.3	93.9	54.2	30.1	76
Mercury, Dissolved	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel, Dissolved	0.7 J	3 J	2.6 J	1.4 J	0.54 J
Potassium, Dissolved	1,410	2,120	1,080	884 J	1,020
Selenium, Dissolved	10 U	10 U	10 U	4.2 J	10 U
Silver, Dissolved	15 U	15 U	15 U	15 U	15 U
Sodium, Dissolved	6,930	8,170	5,510	4,730	8,680
Thallium, Dissolved	0.13 B	0.24 B	2 U	0.44 B	0.25 B
Vanadium, Dissolved	25 U	25 U	25 U	25 U	25 U
Zinc, Dissolved	25 U	2.6 J	25 U	25 U	25 U

Notes:

Shading indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in associated blanks

J - Analyte present, value may or may not be accurate or precise

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UL - Analyte not detected, quantitation limit is probably higher

UG/L - Micrograms per liter

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Station ID	CAS09-SB01	CAS09-SB02	CAS09-SB03	CAS09-SB04	CAS09-SB05	
Sample ID	CAS09-SB01-1009	CAS09-SB02-1109	CAS09-SB03-1109	CAS09-SB04-1109	CAS09-SB05-1109	CAS09-SB05P-1109
Sample Date	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Chemical Name						
Volatile Organic Compounds (UG/KG)						
1,1,1-Trichloroethane	6 UJ	6 U	5 U	6 UJ	6 U	6 U
1,1,2,2-Tetrachloroethane	5 UJ	5 U	4 U	5 UJ	5 U	5 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	6 UJ	6 U	5 U	6 UJ	6 U	6 U
1,1,2-Trichloroethane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
1,1-Dichloroethane	6 UJ	6 U	5 U	6 UJ	6 U	6 U
1,1-Dichloroethene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
1,2,4-Trichlorobenzene	5 UJ	5 U	4 U	5 UJ	5 U	5 UJ
1,2-Dibromo-3-chloropropane	5 UJ	5 U	4 U	5 UJ	5 U	5 UJ
1,2-Dibromoethane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
1,2-Dichlorobenzene	5 UJ	5 U	4 U	5 UJ	5 U	5 UJ
1,2-Dichloroethane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
1,2-Dichloropropane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
1,3-Dichlorobenzene	5 UJ	5 U	4 U	5 UJ	5 U	5 UJ
1,4-Dichlorobenzene	5 UJ	5 U	4 U	5 UJ	5 U	5 UJ
2-Butanone	25 UJ	24 U	22 U	25 UJ	23 U	24 U
2-Hexanone	25 UJ	24 U	22 U	25 UJ	23 U	24 U
4-Methyl-2-pentanone	25 UJ	24 U	22 U	25 UJ	23 U	24 U
Acetone	93 J	44 B	40 B	68 B	86	80
Benzene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Bromodichloromethane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Bromoform	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Bromomethane	10 UJ	10 U	9 U	10 UJ	9 U	9 U
Carbon disulfide	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Carbon tetrachloride	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Chlorobenzene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Chloroethane	10 UJ	10 U	9 U	10 UJ	9 U	9 U
Chloroform	6 UJ	6 U	5 U	6 UJ	6 U	6 U
Chloromethane	10 UJ	10 U	9 U	10 UJ	9 U	9 U
cis-1,2-Dichloroethene	6 UJ	6 U	5 U	6 UJ	6 U	6 U
cis-1,3-Dichloropropene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Cyclohexane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Dibromochloromethane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Dichlorodifluoromethane (Freon-12)	10 UJ	10 U	9 U	10 UJ	9 U	9 U
Ethylbenzene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Isopropylbenzene	5 UJ	5 U	4 U	5 UJ	5 U	5 UJ
m- and p-Xylene	11 UJ	10 U	10 U	11 UJ	10 U	10 U
Methyl acetate	9 UJ	9 U	8 U	9 UJ	8 U	8 U
Methylcyclohexane	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Methylene chloride	25 UJ	24 U	22 U	25 UJ	43	54
Methyl-tert-butyl ether (MTBE)	9 UJ	9 U	8 U	9 UJ	8 U	8 U
o-Xylene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Styrene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Tetrachloroethene	5 UJ	5 U	4 U	5 UJ	5 U	5 U
Toluene	2 J	5 U	2 J	2 J	5 U	5 U
trans-1,2-Dichloroethene	7 UJ	7 U	6 U	7 UJ	6 U	6 U
trans-1,3-Dichloropropene	7 UJ	7 U	6 U	7 UJ	6 U	6 U
Trichloroethene	6 UJ	6 U	5 U	6 UJ	6 U	6 U
Trichlorofluoromethane(Freon-11)	10 UJ	10 U	9 U	10 UJ	9 U	9 U
Vinyl chloride	10 UJ	10 U	9 U	10 UJ	9 U	9 U
Xylene, total	15 UJ	14 U	13 U	15 UJ	14 U	14 U
Semivolatile Organic Compounds (UG/KG)						
1,1-Biphenyl	380 U	360 U	310 U	350 U	360 U	360 U
1,2,4,5-Tetrachlorobenzene	480 U	450 U	390 U	440 U	460 U	460 U
2,2'-Oxybis(1-chloropropane)	380 U	360 U	310 U	350 U	360 U	360 U
2,4,5-Trichlorophenol	940 U	880 U	770 U	860 U	890 U	900 U
2,4,6-Trichlorophenol	550 U	520 U	450 U	500 U	520 U	520 U
2,4-Dichlorophenol	520 U	480 U	420 U	470 U	490 U	490 U
2,4-Dimethylphenol	570 U	540 U	470 U	530 U	540 U	550 U
2,4-Dinitrophenol	1,300 U	1,200 U	1,100 U	1,200 U	1,200 U	1,200 U
2,4-Dinitrotoluene	380 U	360 U	310 U	350 U	360 U	360 U
2,6-Dinitrotoluene	380 U	360 U	310 U	350 U	360 U	360 U
2-Chloronaphthalene	23 U	22 U	19 U	22 U	22 U	22 U
2-Chlorophenol	570 U	540 U	470 U	530 U	540 U	550 U
2-Methylnaphthalene	23 UL	22 U	19 U	22 U	22 U	22 U
2-Methylphenol	690 U	650 U	560 U	630 U	650 U	660 U
2-Nitroaniline	940 U	880 U	770 U	860 U	890 U	900 U
2-Nitrophenol	580 U	550 U	480 U	540 U	550 U	560 U
3- and 4-Methylphenol	650 U	610 U	530 U	600 U	620 U	620 U
3,3'-Dichlorobenzidine	400 U	380 U	330 U	370 U	380 U	380 U
3-Nitroaniline	940 U	880 U	770 U	860 U	890 U	900 U
4,6-Dinitro-2-methylphenol	1,300 U	1,200 U	1,000 U	1,200 U	1,200 U	1,200 U
4-Bromophenyl-phenylether	380 U	360 U	310 U	350 U	360 U	360 U
4-Chloro-3-methylphenol	570 U	540 U	470 U	530 U	540 U	550 U
4-Chloroaniline	410 U	390 U	340 U	380 U	390 U	390 U
4-Chlorophenyl-phenylether	380 U	360 U	310 U	350 U	360 U	360 U
4-Nitroaniline	940 U	880 U	770 U	860 U	890 U	900 U

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Station ID	CAS09-SB01	CAS09-SB02	CAS09-SB03	CAS09-SB04	CAS09-SB05	
Sample ID	CAS09-SB01-1009	CAS09-SB02-1109	CAS09-SB03-1109	CAS09-SB04-1109	CAS09-SB05-1109	CAS09-SB05P-1109
Sample Date	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Chemical Name						
4-Nitrophenol	1,100 U	1,000 U	870 U	980 U	1,000 U	1,000 U
Acenaphthene	23 U	22 U	19 U	22 U	22 U	22 U
Acenaphthylene	23 U	22 U	19 U	1.6 B	22 U	22 U
Acetophenone	620 U	580 U	500 U	570 U	580 U	590 U
Anthracene	23 U	22 U	19 U	2.5 B	22 U	22 U
Atrazine	380 U	360 U	310 U	350 U	360 U	360 U
Benzaldehyde	410 UJ	390 UJ	340 U	380 U	390 U	390 UJ
Benzo(a)anthracene	23 U	22 U	19 U	11 B	4.8 J	22 U
Benzo(a)pyrene	23 U	22 U	19 U	22 U	4.7 J	22 U
Benzo(b)fluoranthene	23 U	2.6 J	19 U	11 J	7.7 J	22 U
Benzo(g,h,i)perylene	23 U	22 U	19 U	8.8 L	22 U	22 U
Benzo(k)fluoranthene	23 U	22 U	19 U	22 U	22 U	22 U
bis(2-Chloroethoxy)methane	380 U	360 U	310 U	350 U	360 U	360 U
bis(2-Chloroethyl)ether	380 U	360 U	310 U	350 U	360 U	360 U
bis(2-Ethylhexyl)phthalate	120 U	110 U	93 U	110 U	59 J	110 U
Butylbenzylphthalate	380 U	360 U	310 U	350 U	360 U	360 U
Caprolactam	500 R	470 R	410 R	460 R	480 R	480 U
Carbazole	23 U	22 U	19 U	3.7 B	22 U	22 U
Chrysene	23 U	1.9 J	19 U	22 U	6.4 J	22 U
Dibenz(a,h)anthracene	23 U	22 U	19 U	12 J	22 U	22 U
Dibenzofuran	380 U	360 U	310 U	350 U	360 U	360 U
Diethylphthalate	380 U	360 U	310 U	350 U	360 U	360 U
Dimethyl phthalate	380 U	360 U	310 U	350 U	360 U	360 U
Di-n-butylphthalate	120 U	110 U	93 U	110 U	110 U	110 U
Di-n-octylphthalate	730 U	690 U	600 U	670 U	690 U	700 U
Fluoranthene	23 U	3.3 J	19 U	4.9 B	10 J	22 U
Fluorene	23 U	22 U	19 U	22 U	22 U	22 U
Hexachlorobenzene	23 U	22 U	19 U	22 U	22 U	22 U
Hexachlorobutadiene	380 U	360 U	310 U	350 U	360 U	360 U
Hexachlorocyclopentadiene	380 U	360 U	310 U	350 U	360 U	360 U
Hexachloroethane	23 UL	22 U	19 U	22 U	22 U	22 U
Indeno(1,2,3-cd)pyrene	23 U	22 U	19 U	7.6 J	4.8 J	22 U
Isophorone	380 U	360 U	310 U	350 U	360 U	360 U
Naphthalene	23 UL	22 U	19 U	22 U	22 U	22 U
n-Nitroso-di-n-propylamine	380 U	360 U	310 U	350 U	360 U	360 U
n-Nitrosodiphenylamine	760 U	710 U	620 U	690 U	720 U	720 U
Nitrobenzene	380 U	360 U	310 U	350 U	360 U	360 U
Pentachlorophenol	120 UL	110 U	93 U	110 U	110 U	110 U
Phenanthrene	23 U	22 U	19 U	2.8 J	5 J	22 U
Phenol	540 U	510 U	440 U	490 U	510 U	510 U
Pyrene	23 U	2.8 J	19 U	22 U	9.2 J	22 U
Pesticide/Polychlorinated Biphenyls (UG/KG)						
4,4'-DDD	3.8 UJ	3.1 J	3.2 U	3.5 U	3.2 U	3.4 U
4,4'-DDE	3.8 UJ	1.3 B	0.55 B	3.5 U	1.2 B	3.4 U
4,4'-DDT	3.8 UJ	3.4 U	0.92 B	1.1 B	8.4	3.4 U
Aldrin	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
alpha-BHC	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
alpha-Chlordane	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
Aroclor-1016	21 U	19 U	17 U	19 U	17 U	19 U
Aroclor-1221	49 U	44 U	40 U	45 U	40 U	44 U
Aroclor-1232	32 U	29 U	27 U	30 U	27 U	29 U
Aroclor-1242	21 U	19 U	17 U	19 U	17 U	19 U
Aroclor-1248	22 U	20 U	18 U	20 U	18 U	20 U
Aroclor-1254	20 U	18 U	16 U	18 U	16 U	18 U
Aroclor-1260	21 U	41	17 U	19 U	100	19 U
beta-BHC	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
delta-BHC	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
Dieldrin	3.8 UJ	3.4 U	3.2 U	3.5 U	1.4 J	3.4 U
Endosulfan I	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
Endosulfan II	3.8 UJ	0.76 J	3.2 U	3.5 U	1.1 J	3.4 U
Endosulfan sulfate	3.8 UJ	3.4 U	3.2 U	0.76 J	6.4 J	3.4 U
Endrin	3.8 UJ	3.4 U	3.2 U	3.5 U	3.2 U	3.4 U
Endrin aldehyde	3.8 UJ	3.4 U	3.2 U	3.5 U	3.2 U	3.4 U
Endrin ketone	3.8 UJ	3.4 U	3.2 U	3.5 U	3.2 U	3.4 U
gamma-BHC (Lindane)	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
gamma-Chlordane	2 UJ	1.8 U	1.6 U	1.8 U	0.84 J	1.8 U
Heptachlor	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
Heptachlor epoxide	2 UJ	1.8 U	1.6 U	1.8 U	1.6 U	1.8 U
Methoxychlor	20 UJ	18 U	16 U	18 U	16 U	18 U
Toxaphene	38 UJ	34 U	32 U	35 U	32 U	34 U
Total Metals (MG/KG)						
Aluminum	27,300	18,900	7,180	10,400	17,000	17,600
Antimony	0.22 L	0.16 L	0.07 L	0.1 L	0.13 L	0.15 L
Arsenic	7.1	4	1.6	2.6	4.1	4.3
Barium	35.3	48.2	28.4	37.8	44.4	38.7
Beryllium	0.59	0.59	0.39 J	0.48	0.43 J	0.42 J
Cadmium	2.2 U	0.86 U	1 U	0.7 U	1 U	0.98 U

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Station ID	CAS09-SB01	CAS09-SB02	CAS09-SB03	CAS09-SB04	CAS09-SB05	
Sample ID	CAS09-SB01-1009	CAS09-SB02-1109	CAS09-SB03-1109	CAS09-SB04-1109	CAS09-SB05-1109	CAS09-SB05P-1109
Sample Date	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Chemical Name						
Calcium	1,960	1,970	667	1,130	1,630	1,670
Chromium	40.7 K	26.9 K	10.6 K	15.6 K	23.4 K	24.6 K
Cobalt	4.7	3.6	1.9	2.4	3.1	3.2
Copper	5.9 K	106 K	3.8 K	8.9 K	4.8 K	3.9 K
Cyanide	0.36 J	0.84 U	0.77 U	0.77 U	0.84 U	0.77 U
Iron	28,700	20,700	8,400	13,000	19,400	19,700
Lead	9.6 K	10.2 K	7.6 K	6.9 K	7.1 K	7 K
Magnesium	1,740 K	1,720 K	468 K	811 K	1,020 K	1,020 K
Manganese	34.3 K	106 K	83.4 K	78.1 K	36.4 K	34.1 K
Mercury	0.04	0.01 J	0.036 U	0.032 U	0.02 J	0.05
Nickel	10.3 J	13.2 J	3.3 J	5 J	5.8 J	6.4 J
Potassium	879 K	801 K	297 K	575 K	483 K	471 K
Selenium	0.34 J	0.37 J	0.26 J	0.19 J	0.33 J	0.37 J
Silver	3.4 U	1.3 U	1.6 U	1 U	1.5 U	1.5 U
Sodium	42.6 K	51.4 K	20.8 K	33 K	37.9 K	36.7 K
Thallium	0.2 B	0.16 B	0.09 B	0.11 B	0.17 B	0.16 B
Vanadium	52.2	34.1	14.1	20.5	32.5	34.1
Zinc	21.7 K	34 K	9.1 K	16.5 K	15.4 K	14.7 K
Wet Chemistry						
pH	6.2	7.3	7	7.2	8	7.3
Total organic carbon (TOC) (UG/G)	1,800	1,500	2,700	2,000	1,500	2,000
Grain Size (PCT/P)						
GS07 Sieve 1" (25.0 mm)	100	100	100	100	100	100
GS08 Sieve 0.75" (19.0 mm)	100	100	100	100	100	100
GS09 Sieve 0.5" (12.5 mm)	100	100	100	100	100	100
GS10 Sieve 0.375" (9.5 mm)	100	100	100	100	100	100
Sieve No. 004 (4.75 mm)	100	100	100	100	100	100
Sieve No. 010 (2.00 mm)	100	99	100	99	100	100
Sieve No. 020 (850 um)	99	98	98	97	99	99
Sieve No. 040 (425 um)	94	93	93	93	95	85
Sieve No. 060 (250 um)	72	72	67	71	74	74
Sieve No. 100 (150 um)	50	52	45	49	55	54
Sieve No. 200 (75 um)	41	41	37	40	44	44

Notes:

Shading indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

Station ID	CAS09-SD01		CAS09-SD02		CAS09-SD03	
Sample ID	CAS09-SD01-1209A	CAS09-SD01-1209B	CAS09-SD02-1209A	CAS09-SD02-1209B	CAS09-SD03-1209A	CAS09-SD03-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name						
Volatile Organic Compounds (UG/KG)						
1,1,1-Trichloroethane	7 UJ	7 U	7 UJ	7 U	8 UJ	7 U
1,1,2,2-Tetrachloroethane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	7 UJ	7 U	7 UJ	7 U	8 UJ	7 U
1,1,2-Trichloroethane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
1,1-Dichloroethane	7 UJ	7 U	7 UJ	7 U	8 UJ	7 U
1,1-Dichloroethene	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
1,2,4-Trichlorobenzene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
1,2-Dibromo-3-chloropropane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
1,2-Dibromoethane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
1,2-Dichlorobenzene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
1,2-Dichloroethane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
1,2-Dichloropropane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
1,3-Dichlorobenzene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
1,4-Dichlorobenzene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
2-Butanone	31 UJ	29 U	30 UJ	30 U	33 UJ	29 U
2-Hexanone	31 UJ	29 U	30 UJ	30 UL	33 UJ	29 U
4-Methyl-2-pentanone	31 UJ	29 U	30 UJ	30 U	33 UJ	29 U
Acetone	11 B	7 B	12 B	8 B	85 B	14 B
Benzene	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Bromodichloromethane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Bromoform	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Bromomethane	12 UJ	12 U	12 UJ	12 U	13 UJ	12 U
Carbon disulfide	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Carbon tetrachloride	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Chlorobenzene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
Chloroethane	12 UJ	12 U	12 UJ	12 U	13 UJ	12 U
Chloroform	7 UJ	7 U	7 UJ	7 U	8 UJ	7 U
Chloromethane	12 UJ	12 U	12 UJ	12 U	13 UJ	12 U
cis-1,2-Dichloroethene	7 UJ	7 U	7 UJ	7 U	8 UJ	7 U
cis-1,3-Dichloropropene	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Cyclohexane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Dibromochloromethane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Dichlorodifluoromethane (Freon-12)	12 UJ	12 U	12 UJ	12 U	13 UJ	12 U
Ethylbenzene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
Isopropylbenzene	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
m- and p-Xylene	14 UJ	13 U	13 UJ	13 UL	15 UJ	13 U
Methyl acetate	11 UJ	10 U	11 UJ	11 UL	12 UJ	10 U
Methylcyclohexane	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
Methylene chloride	31 UJ	29 U	30 UJ	30 U	33 UJ	29 U
Methyl-tert-butyl ether (MTBE)	11 UJ	10 U	11 UJ	11 U	12 UJ	10 U
o-Xylene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
Styrene	6 UJ	6 U	6 UJ	6 UL	7 UJ	6 U
Tetrachloroethene	2 J	6 U	5 J	4 J	15 J	6 U
Toluene	6 UJ	6 U	6 UJ	6 U	7 UJ	6 U
trans-1,2-Dichloroethene	9 UJ	8 U	8 UJ	8 U	9 UJ	8 U
trans-1,3-Dichloropropene	9 UJ	8 U	8 UJ	8 U	9 UJ	8 U
Trichloroethene	7 UJ	7 U	7 UJ	7 U	8 UJ	7 U
Trichlorofluoromethane(Freon-11)	12 UJ	12 U	12 UJ	12 U	13 UJ	12 U
Vinyl chloride	12 UJ	12 U	12 UJ	12 U	13 UJ	12 U
Xylene, total	19 UJ	17 U	18 UJ	18 UL	20 UJ	18 U
Semivolatile Organic Compounds (UG/KG)						
1,1-Biphenyl	420 U	360 U	380 UL	400 U	430 U	420 U
1,2,4,5-Tetrachlorobenzene	540 U	460 U	490 U	520 U	550 U	540 U
2,2'-Oxybis(1-chloropropane)	420 U	360 U	380 U	400 U	430 U	420 U
2,4,5-Trichlorophenol	1,000 U	900 U	960 U	1,000 U	1,100 U	1,000 U
2,4,6-Trichlorophenol	620 U	520 U	560 U	590 U	620 U	620 U
2,4-Dichlorophenol	580 U	490 U	520 U	550 U	580 U	580 U
2,4-Dimethylphenol	640 U	550 U	580 U	610 U	650 U	640 U
2,4-Dinitrophenol	1,500 U	1,200 U	1,300 R	1,400 U	1,500 U	1,500 U
2,4-Dinitrotoluene	420 U	360 U	380 UL	400 U	430 U	420 U
2,6-Dinitrotoluene	420 U	360 U	380 UL	400 U	430 U	420 U
2-Chloronaphthalene	28 U	22 U	23 U	24 U	26 U	26 U
2-Chlorophenol	640 U	550 U	580 UL	610 U	650 U	640 U
2-Methylnaphthalene	28 U	22 U	23 U	24 U	26 U	26 U
2-Methylphenol	770 U	660 U	700 UL	740 U	780 U	770 U
2-Nitroaniline	1,000 U	900 U	960 UL	1,000 U	1,100 U	1,000 U
2-Nitrophenol	660 U	560 U	600 U	630 U	660 U	660 U
3- and 4-Methylphenol	740 U	620 U	670 UL	700 U	740 U	740 U
3,3'-Dichlorobenzidine	450 U	380 U	410 U	430 U	460 U	450 U
3-Nitroaniline	1,000 U	900 U	960 U	1,000 U	1,100 U	1,000 U
4,6-Dinitro-2-methylphenol	1,400 U	1,200 U	1,300 UL	1,400 U	1,400 U	1,400 U
4-Bromophenyl-phenylether	420 U	360 U	380 U	400 U	430 U	420 U
4-Chloro-3-methylphenol	640 U	550 U	580 UL	610 U	650 U	640 U
4-Chloroaniline	460 U	390 U	420 U	440 U	470 U	460 U
4-Chlorophenyl-phenylether	420 U	360 U	380 U	400 U	430 U	420 U
4-Nitroaniline	1,000 U	900 U	960 UL	1,000 U	1,100 U	1,000 U

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Station ID	CAS09-SD01		CAS09-SD02		CAS09-SD03	
Sample ID	CAS09-SD01-1209A	CAS09-SD01-1209B	CAS09-SD02-1209A	CAS09-SD02-1209B	CAS09-SD03-1209A	CAS09-SD03-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name						
4-Nitrophenol	1,200 U	1,000 U	1,100 U	1,100 U	1,200 U	1,200 U
Acenaphthene	20 J	22 U	23 U	24 U	26 U	26 U
Acenaphthylene	9.5 J	22 U	23 U	1.8 J	1.8 J	26 U
Acetophenone	700 U	590 U	630 UL	660 U	700 U	700 U
Anthracene	40	22 U	23 U	24 U	26 U	26 U
Atrazine	420 U	360 U	380 UL	400 U	430 U	420 U
Benzaldehyde	460 U	390 U	420 U	440 U	470 U	460 U
Benzo(a)anthracene	260	16 B	17 B	15 B	27 B	8.4 B
Benzo(a)pyrene	210	11 J	11 J	9.1 J	19 J	26 U
Benzo(b)fluoranthene	370	25 B	26 B	24 B	49	26 U
Benzo(g,h,i)perylene	38	22 U	23 UL	24 UL	4.1 J	26 U
Benzo(k)fluoranthene	110	6.5 J	5.2 J	5.7 J	14 J	26 U
bis(2-Chloroethoxy)methane	420 U	360 U	380 UL	400 U	430 U	420 U
bis(2-Chloroethyl)ether	420 U	360 U	380 U	400 U	430 U	420 U
bis(2-Ethylhexyl)phthalate	63 J	110 U	120 U	120 U	130 U	130 U
Butylbenzylphthalate	420 U	360 U	380 U	400 U	430 U	420 U
Caprolactam	570 R	480 R	510 R	540 R	570 R	570 R
Carbazole	52	5.5 B	6.3 B	6.4 B	6.8 B	6.2 B
Chrysene	290	7.1 J	6.4 J	3.8 J	20 J	26 U
Dibenz(a,h)anthracene	78 J	22 U	23 U	24 U	14 J	26 U
Dibenzofuran	420 U	360 U	380 U	400 U	430 U	420 U
Diethylphthalate	420 U	360 U	380 U	400 U	430 U	420 U
Dimethyl phthalate	420 U	360 U	380 UL	400 U	430 U	420 U
Di-n-butylphthalate	140 U	110 U	120 U	120 U	130 U	130 U
Di-n-octylphthalate	820 U	700 U	750 U	780 U	830 U	820 U
Fluoranthene	560	28	26 K	19 J	46	4.1 J
Fluorene	27 J	22 U	23 U	24 U	26 U	26 U
Hexachlorobenzene	28 U	22 U	23 U	24 U	26 U	26 U
Hexachlorobutadiene	420 U	360 U	380 U	400 U	430 U	420 U
Hexachlorocyclopentadiene	420 U	360 U	380 U	400 U	430 U	420 U
Hexachloroethane	28 U	22 U	23 U	24 U	26 U	26 U
Indeno(1,2,3-cd)pyrene	190	11 J	12 J	11 J	20 J	26 U
Isophorone	420 U	360 U	380 UL	400 U	430 U	420 U
Naphthalene	14 J	22 U	23 U	24 U	26 U	26 U
n-Nitroso-di-n-propylamine	420 U	360 U	380 U	400 U	430 U	420 U
n-Nitrosodiphenylamine	850 U	720 U	770 UL	810 U	860 U	850 U
Nitrobenzene	420 U	360 U	380 U	400 U	430 U	420 U
Pentachlorophenol	140 U	110 U	120 U	120 U	130 U	130 U
Phenanthrene	320	12 J	14 J	11 J	18 J	26 U
Phenol	610 U	510 U	550 UL	580 U	610 U	610 U
Pyrene	370	18 J	20 J	14 J	31	3.3 J
Pesticide/Polychlorinated Biphenyls (UG/KG)						
4,4'-DDD	370 J	46 J	40 J	4 UJ	4.5 U	4.1 U
4,4'-DDE	52 J	5.1 J	2.7 B	5.3 J	24 J	2.9 B
4,4'-DDT	800	49 J	44 J	110 J	550	68
Aldrin	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
alpha-BHC	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
alpha-Chlordane	2.3 J	0.48 J	2 UJ	0.62 J	1.5 J	2.1 U
Aroclor-1016	120 UJ	20 U	21 UL	22 UJ	120 UJ	22 UJ
Aroclor-1221	290 UJ	46 U	49 U	51 UJ	280 UJ	52 UJ
Aroclor-1232	190 UJ	31 U	32 U	34 UJ	190 UJ	35 UJ
Aroclor-1242	120 UJ	20 U	21 U	22 UJ	120 UJ	22 UJ
Aroclor-1248	130 UJ	21 U	22 U	23 UJ	130 UJ	24 UJ
Aroclor-1254	120 UJ	19 U	20 U	20 UJ	110 UJ	21 UJ
Aroclor-1260	9,700 J	620	540 K	1,700 J	7,300 J	940 J
beta-BHC	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
delta-BHC	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
Dieldrin	140 J	7.7 J	6.8 J	4 UJ	4.5 U	4.1 U
Endosulfan I	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
Endosulfan II	90 J	5.7 J	5.5 J	17 J	80 J	10 J
Endosulfan sulfate	540 J	34 J	29 J	4 UJ	4.5 U	4.1 U
Endrin	4.5 UJ	3.6 UJ	3.8 UJ	4 UJ	4.5 U	4.1 U
Endrin aldehyde	4.5 UJ	3.6 UJ	3.8 UJ	4 UJ	4.5 U	4.1 U
Endrin ketone	620 J	3.6 UJ	3.8 UJ	4 UJ	4.5 U	4.1 U
gamma-BHC (Lindane)	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
gamma-Chlordane	78 J	4.6 J	3.2 J	11 J	52 J	5.9 J
Heptachlor	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
Heptachlor epoxide	2.3 UJ	1.9 UJ	2 UJ	2 UJ	2.3 U	2.1 U
Methoxychlor	23 UJ	19 UJ	20 UJ	20 UJ	23 U	21 U
Toxaphene	45 UJ	36 UJ	38 UJ	40 UJ	45 U	41 U
Total Metals (MG/KG)						
Aluminum	10,100	8,340	21,500	33,500	26,000	32,900
Antimony	0.47 B	0.34 B	1.2 UL	1.5 UL	0.52 B	1.9 UL
Arsenic	3.1 L	2.1 L	6.2 L	8.8 L	6.5 L	10.3 L
Barium	44.8	34.4	60.7	75.4	59.1	76.6
Beryllium	0.61	0.4 J	0.57	0.99	0.83	0.98
Cadmium	0.74	0.25	0.24	0.04 J	0.38	0.11 J

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Station ID	CAS09-SD01		CAS09-SD02		CAS09-SD03	
Sample ID	CAS09-SD01-1209A	CAS09-SD01-1209B	CAS09-SD02-1209A	CAS09-SD02-1209B	CAS09-SD03-1209A	CAS09-SD03-1209B
Sample Date	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09	12/09/09
Chemical Name						
Calcium	1,580	720	1,910	2,900	2,160	2,850
Chromium	16.8 L	11.5 L	31.7 L	45.8 L	37.5 L	46.3 L
Cobalt	3	1.9 J	3.6 J	5 J	4	5.1 J
Copper	55.1 J	7.1 J	9.9 J	4.7 J	16.3 J	5.5 J
Cyanide	0.98 U	0.7 U	0.84 U	0.84 U	0.84 U	0.91 U
Iron	10,500	8,270	21,700	30,600	25,200	31,800
Lead	64.8	15	40.3	11.7	33.9	13
Magnesium	1,510	617	1,570	2,320	1,830	2,260
Manganese	135	88.4	35.8	30.7	42.1	30.8
Mercury	0.26	0.15	0.07	0.04	0.18	0.06
Nickel	9	4.2	9.1	13.4	10.4	13.4
Potassium	686 K	478 K	718 K	1,300 K	1,060 K	1,210 K
Selenium	0.9 U	0.21 J	1.5 U	0.53 J	0.65 J	2.4 U
Silver	0.08 B	1.3 U	0.15 B	2.7 U	1.8 U	3.5 U
Sodium	42 B	15.7 B	27.9 B	51 B	45.2 B	48.3 B
Thallium	1.4 U	1.3 U	2.3 U	0.35 J	1.8 U	3.5 U
Vanadium	24.6	15	44.3	61.2	48.2	60.1
Zinc	104	31.5	46.2	25.3	53.8	27
Wet Chemistry						
pH	6.1	6.2	6.1	6	6.3	6
Total organic carbon (TOC) (UG/G)	25,000	3,100	8,100	3,700	13,000	4,200

Notes:

Shading indicates detections

NA - Not analyzed

B - Analyte not detected above the level reported in associated blanks

J - Analyte present, value may or may not be accurate or precise

K - Analyte present, value may be biased high, actual value may be lower

L - Analyte present, value may be biased low, actual value may be higher

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UL - Analyte not detected, quantitation limit is probably higher

MG/KG - Milligrams per kilogram

PH - pH units

UG/G - Micrograms per gram

UG/KG - Micrograms per kilogram

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Surface Soil Data Raw Analytical Results
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Station ID	CAS009-9S01	CAS009-9S02	CAS009-9S03	CAS009-9S04	CAS009-9S05	CAS009-9S06	CAS009-9S07	CAS009-9S08	CAS009-9S09	CAS009-9S10	CAS009-9S11	CAS009-9S12	CAS009-9S13
Sample ID	CAS009-9S01-00-1286	CAS009-9S02-00-1286	CAS009-9S03-00-1286	CAS009-9S04-00-1286	CAS009-9S05-00-1286	CAS009-9S06-00-1286	CAS009-9S07-00-1286	CAS009-9S08-00-1286	CAS009-9S09-00-1286	CAS009-9S10-00-1286	CAS009-9S11-00-1286	CAS009-9S12-00-1286	CAS009-9S13-00-1286
Sample Date	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Chemical Name													
Volatile Organic Compounds (UG/KG)													
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m- and p-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane(Freon-11)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (UG/KG)													
1,1-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4,5-Tetrachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,2'-Oxybis(1-chloropropane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3- and 4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Station ID	CAS009-9S01	CAS009-9S02	CAS009-9S03	CAS009-9S04	CAS009-9S05	CAS009-9S06	CAS009-9S07	CAS009-9S08	CAS009-9S09	CAS009-9S10	CAS009-9S11	CAS009-9S12	CAS009-9S13
Sample ID	CAS009-9S01-00-1286	CAS009-9S02-00-1286	CAS009-9S03-00-1286	CAS009-9S04-00-1286	CAS009-9S05-00-1286	CAS009-9S06-00-1286	CAS009-9S07-00-1286	CAS009-9S08-00-1286	CAS009-9S09-00-1286	CAS009-9S10-00-1286	CAS009-9S11-00-1286	CAS009-9S12-00-1286	CAS009-9S13-00-1286
Sample Date	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Chemical Name													
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticide/Polychlorinated Biphenyls (UG/KG)													
4,4'-DDD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aroclor-1221	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aroclor-1232	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aroclor-1242	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aroclor-1248	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aroclor-1254	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Aroclor-1260	10 U	10 U	10 U	41	35	22	10 U	10 U	195	21	29	321	82
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin/Furans (PG/G)													
2,3,7,8-TCDD (dioxin)	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U	50,000 U
Total Metals (MG/KG)													
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Station ID	CAS009-9S01	CAS009-9S02	CAS009-9S03	CAS009-9S04	CAS009-9S05	CAS009-9S06	CAS009-9S07	CAS009-9S08	CAS009-9S09	CAS009-9S10	CAS009-9S11	CAS009-9S12	CAS009-9S13
Sample ID	CAS009-9S01-00-1286	CAS009-9S02-00-1286	CAS009-9S03-00-1286	CAS009-9S04-00-1286	CAS009-9S05-00-1286	CAS009-9S06-00-1286	CAS009-9S07-00-1286	CAS009-9S08-00-1286	CAS009-9S09-00-1286	CAS009-9S10-00-1286	CAS009-9S11-00-1286	CAS009-9S12-00-1286	CAS009-9S13-00-1286
Sample Date	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86	12/25/86
Chemical Name													
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wet Chemistry													
pH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total organic carbon (TOC) (UG/G)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Grain Size (PCT/P)													
GS07 Sieve 1" (25.0 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GS08 Sieve 0.75" (19.0 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GS09 Sieve 0.5" (12.5 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GS10 Sieve 0.375" (9.5 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 004 (4.75 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 010 (2.00 mm)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 020 (850 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 040 (425 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 060 (250 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 100 (150 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sieve No. 200 (75 um)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PG/G - Picograms per gram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

Station ID	CAS09-SS01	CAS09-SS02	CAS09-SS03	CAS09-SS04	CAS09-SS05	
Sample ID	CAS09-SS01-1009	CAS09-SS02-1109	CAS09-SS03-1109	CAS09-SS04-1109	CAS09-SS05-1109	CAS09-SS05P-1109
Sample Date	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Chemical Name						
Volatile Organic Compounds (UG/KG)						
1,1,1-Trichloroethane	6 UJ	5 UJ	6 U	6 UJ	6 U	6 U
1,1,2,2-Tetrachloroethane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	6 UJ	5 R	6 U	6 UJ	6 U	6 U
1,1,2-Trichloroethane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
1,1-Dichloroethane	6 UJ	5 UJ	6 U	6 UJ	6 U	6 U
1,1-Dichloroethene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
1,2,4-Trichlorobenzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 UJ
1,2-Dibromo-3-chloropropane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 UJ
1,2-Dibromoethane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
1,2-Dichlorobenzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 UJ
1,2-Dichloroethane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
1,2-Dichloropropane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
1,3-Dichlorobenzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 UJ
1,4-Dichlorobenzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 UJ
2-Butanone	24 UJ	22 UJ	24 U	27 UJ	27 U	27 U
2-Hexanone	24 UJ	22 UJ	24 U	27 UJ	27 U	27 U
4-Methyl-2-pentanone	24 UJ	22 UJ	24 U	27 UJ	27 U	27 U
Acetone	66 B	82 B	52 B	68 B	140	100
Benzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Bromodichloromethane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Bromoform	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Bromomethane	10 UJ	9 UJ	9 U	11 UJ	11 U	11 U
Carbon disulfide	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Carbon tetrachloride	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Chlorobenzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Chloroethane	10 UJ	9 UJ	9 U	11 UJ	11 U	11 U
Chloroform	6 UJ	5 UJ	6 U	6 UJ	6 U	6 U
Chloromethane	10 UJ	9 UJ	9 U	11 UJ	11 U	11 U
cis-1,2-Dichloroethene	6 UJ	5 UJ	6 U	6 UJ	6 U	6 U
cis-1,3-Dichloropropene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Cyclohexane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Dibromochloromethane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Dichlorodifluoromethane (Freon-12)	10 UJ	9 UJ	9 U	11 UJ	11 U	11 U
Ethylbenzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Isopropylbenzene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 UJ
m- and p-Xylene	10 UJ	10 UJ	10 U	12 UJ	12 U	12 U
Methyl acetate	9 UJ	8 UJ	8 U	10 UJ	10 U	10 U
Methylcyclohexane	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Methylene chloride	24 UJ	20 J	9 J	27 UJ	25 J	50
Methyl-tert-butyl ether (MTBE)	9 UJ	8 UJ	8 U	10 UJ	10 U	10 U
o-Xylene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Styrene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Tetrachloroethene	5 UJ	4 UJ	5 U	5 UJ	5 U	5 U
Toluene	2 J	4 UJ	5 U	5 UJ	5 U	5 U
trans-1,2-Dichloroethene	7 UJ	6 UJ	6 U	8 UJ	8 U	8 U
trans-1,3-Dichloropropene	7 UJ	6 UJ	6 U	8 UJ	8 U	8 U
Trichloroethene	6 UJ	5 UJ	6 U	6 UJ	6 U	6 U
Trichlorofluoromethane(Freon-11)	10 UJ	9 UJ	9 U	11 UJ	11 U	11 U
Vinyl chloride	10 UJ	9 UJ	9 U	11 UJ	11 U	11 U
Xylene, total	14 UJ	13 UJ	14 U	16 UJ	16 U	16 U
Semivolatile Organic Compounds (UG/KG)						
1,1-Biphenyl	340 U	330 U	340 U	360 U	360 U	350 U
1,2,4,5-Tetrachlorobenzene	430 U	420 U	440 U	460 U	460 U	450 U
2,2'-Oxybis(1-chloropropane)	340 U	330 U	340 U	360 U	360 U	350 U
2,4,5-Trichlorophenol	840 U	820 U	850 U	900 U	910 U	880 U
2,4,6-Trichlorophenol	490 U	480 U	500 U	530 U	530 U	510 U
2,4-Dichlorophenol	460 U	450 U	470 U	490 U	500 U	480 U
2,4-Dimethylphenol	510 U	500 U	520 U	550 U	550 U	530 U
2,4-Dinitrophenol	1,200 U	1,100 U	1,200 U	1,200 U	1,300 U	1,200 U
2,4-Dinitrotoluene	340 U	330 U	340 U	360 U	360 U	350 U
2,6-Dinitrotoluene	340 U	330 U	340 U	360 U	360 U	350 U
2-Chloronaphthalene	20 U	20 U	21 U	22 U	22 U	21 U
2-Chlorophenol	510 U	500 U	520 U	550 U	550 U	530 U
2-Methylnaphthalene	20 UL	20 U	21 U	22 U	22 U	21 U
2-Methylphenol	610 U	600 U	620 U	660 U	660 U	640 U
2-Nitroaniline	840 U	820 U	850 U	900 U	910 U	880 U
2-Nitrophenol	520 U	510 U	530 U	560 U	560 U	540 U
3- and 4-Methylphenol	580 U	570 U	590 U	620 U	630 U	610 U
3,3'-Dichlorobenzidine	360 U	350 U	360 U	380 U	390 U	370 U
3-Nitroaniline	840 U	820 U	850 U	900 U	910 U	880 U
4,6-Dinitro-2-methylphenol	1,100 U	1,100 U	1,100 U	1,200 U	1,200 U	1,200 U
4-Bromophenyl-phenylether	340 U	330 U	340 U	360 U	360 U	350 U
4-Chloro-3-methylphenol	510 U	500 U	520 U	550 U	550 U	530 U
4-Chloroaniline	370 U	360 U	380 U	390 U	400 U	380 U
4-Chlorophenyl-phenylether	340 U	330 U	340 U	360 U	360 U	350 U
4-Nitroaniline	840 U	820 U	850 U	900 U	910 U	880 U

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Station ID	CAS09-SS01	CAS09-SS02	CAS09-SS03	CAS09-SS04	CAS09-SS05	
Sample ID	CAS09-SS01-1009	CAS09-SS02-1109	CAS09-SS03-1109	CAS09-SS04-1109	CAS09-SS05-1109	CAS09-SS05P-1109
Sample Date	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Chemical Name						
4-Nitrophenol	950 U	930 U	970 U	1,000 U	1,000 U	990 U
Acenaphthene	20 U	1.7 J	21 U	22 U	22 U	21 U
Acenaphthylene	20 U	1.2 J	21 U	22 U	22 U	21 U
Acetophenone	550 U	540 U	560 U	590 U	600 U	580 U
Anthracene	20 U	6.5 J	21 U	2.1 J	22 U	21 U
Atrazine	340 U	330 U	340 U	360 U	360 U	350 U
Benzaldehyde	370 UJ	360 U	380 UJ	390 U	400 U	380 U
Benzo(a)anthracene	20 U	40	3.4 J	12 J	22 U	4.4 J
Benzo(a)pyrene	20 U	39	21 U	8.1 J	22 U	3.9 J
Benzo(b)fluoranthene	20 U	61	5.5 J	18 J	22 U	7 J
Benzo(g,h,i)perylene	20 U	15 J	21 U	3.2 L	22 U	2.5 J
Benzo(k)fluoranthene	20 U	24	21 U	6.9 J	22 U	21 U
bis(2-Chloroethoxy)methane	340 U	330 U	340 U	360 U	360 U	350 U
bis(2-Chloroethyl)ether	340 U	330 U	340 U	360 U	360 U	350 U
bis(2-Ethylhexyl)phthalate	100 U	100 U	100 U	110 U	110 U	110 U
Butylbenzylphthalate	340 U	330 U	340 U	360 U	360 U	350 U
Caprolactam	450 R	440 R	460 R	480 R	490 R	470 R
Carbazole	20 U	2.7 J	21 U	22 U	22 U	21 U
Chrysene	20 U	43	4.6 J	20 L	22 U	5.4 J
Dibenz(a,h)anthracene	20 U	5 J	21 U	22 U	22 U	21 U
Dibenzofuran	340 U	330 U	340 U	360 U	360 U	350 U
Diethylphthalate	340 U	330 U	340 U	360 U	360 U	350 U
Dimethyl phthalate	340 U	330 U	340 U	360 U	360 U	350 U
Di-n-butylphthalate	100 U	100 UJ	100 U	110 U	110 U	110 U
Di-n-octylphthalate	650 U	640 U	670 U	700 U	710 U	680 U
Fluoranthene	20 U	81	7.1 J	60 L	22 U	9.2 J
Fluorene	20 U	20 U	21 U	22 U	22 U	21 U
Hexachlorobenzene	20 U	20 U	21 U	22 U	22 U	21 U
Hexachlorobutadiene	340 U	330 U	340 U	360 U	360 U	350 U
Hexachlorocyclopentadiene	340 U	330 U	340 U	360 U	360 U	350 U
Hexachloroethane	20 UL	20 U	21 U	22 U	22 U	21 U
Indeno(1,2,3-cd)pyrene	20 U	41	4 J	9.2 J	22 U	4.7 J
Isophorone	340 U	330 U	340 U	360 U	360 U	350 U
Naphthalene	20 UL	20 U	21 U	22 U	22 U	21 U
n-Nitroso-di-n-propylamine	340 U	330 U	340 U	360 U	360 U	350 U
n-Nitrosodiphenylamine	670 U	660 U	690 U	720 U	730 U	700 U
Nitrobenzene	340 U	330 U	340 U	360 U	360 U	350 U
Pentachlorophenol	100 UL	100 UJ	100 U	110 U	110 U	110 U
Phenanthrene	20 U	32	3.3 J	15 J	22 U	3.9 J
Phenol	480 U	470 U	490 U	520 U	520 U	500 U
Pyrene	20 U	69	7.5 J	46 L	22 U	8.8 J
Pesticide/Polychlorinated Biphenyls (UG/KG)						
4,4'-DDD	3.5 U	3.3 U	6.7 J	3.6 U	3.5 U	3.1 U
4,4'-DDE	0.65 B	5.8 J	2.1 B	1.6 B	3.5 U	1.5 B
4,4'-DDT	3.5 U	59 J	8 J	13	0.9 B	3.1 U
Aldrin	1.8 U	1.7 U	1.9 U	1.8 U	1.8 U	1.6 U
alpha-BHC	1.8 U	1.7 U	1.9 U	1.8 U	1.8 U	1.6 U
alpha-Chlordane	1.8 U	0.48 J	1.9 U	1.8 U	1.8 U	1.6 U
Aroclor-1016	19 U	18 U	20 U	19 UL	19 U	17 U
Aroclor-1221	44 U	42 U	46 U	45 U	45 U	40 U
Aroclor-1232	29 U	28 U	31 U	30 U	30 U	26 U
Aroclor-1242	19 U	18 U	20 U	19 U	19 U	17 U
Aroclor-1248	20 U	19 U	21 U	20 U	20 U	18 U
Aroclor-1254	18 U	17 U	19 U	18 U	18 U	16 U
Aroclor-1260	9.5 J	760	86	150	19 U	150
beta-BHC	1.8 U	1.7 U	1.9 U	1.8 U	1.8 U	1.6 U
delta-BHC	1.8 U	1.7 U	1.9 U	1.8 U	1.8 U	1.6 U
Dieldrin	3.5 U	11 J	3.6 U	1.6 J	3.5 U	3.1 U
Endosulfan I	1.8 U	1 J	1.9 U	1.8 U	1.8 U	1.6 U
Endosulfan II	3.5 U	10 J	1.1 J	1.5 J	3.5 U	1.7 J
Endosulfan sulfate	3.5 U	30 J	4.6 J	8.8 J	3.5 U	3.1 U
Endrin	3.5 U	3.3 U	3.6 U	3.6 U	3.5 U	3.1 U
Endrin aldehyde	3.5 U	3.3 U	3.6 U	3.6 U	3.5 U	3.1 U
Endrin ketone	3.5 U	3.3 U	3.6 U	3.6 U	3.5 U	3.1 U
gamma-BHC (Lindane)	1.8 U	1.7 U	1.9 U	0.63 J	1.8 U	1.6 U
gamma-Chlordane	1.8 U	7.6 J	1.9 U	0.91 J	1.8 U	1.1 J
Heptachlor	1.8 U	1.7 U	1.9 U	1.8 U	1.8 U	1.6 U
Heptachlor epoxide	1.8 U	1.7 U	1.9 U	1.8 U	1.8 U	1.6 U
Methoxychlor	18 U	17 U	19 U	18 U	18 U	16 U
Toxaphene	35 U	33 U	36 U	36 U	35 U	31 U
Dioxin/Furans (PG/G)						
2,3,7,8-TCDD (dioxin)	NA	NA	NA	NA	NA	NA
Total Metals (MG/KG)						
Aluminum	4,490	9,680	5,090	9,630	9,780	12,900
Antimony	0.06 L	0.2 L	0.1 L	0.14 L	0.14 L	0.15 L
Arsenic	1.1	1.5	0.91	1.7	1.9	2.4

CTO-190
Cheatham Annex Site 9
Surface Soil Data Raw Analytical Results
December 2009

Station ID	CAS09-SS01	CAS09-SS02	CAS09-SS03	CAS09-SS04	CAS09-SS05	
Sample ID	CAS09-SS01-1009	CAS09-SS02-1109	CAS09-SS03-1109	CAS09-SS04-1109	CAS09-SS05-1109	CAS09-SS05P-1109
Sample Date	10/29/09	11/02/09	11/02/09	11/02/09	11/02/09	11/02/09
Chemical Name						
Barium	26.3	33.7	22.5	96.6	49.5	48.2
Beryllium	0.35 J	0.94	0.25 J	0.55	0.49	0.51
Cadmium	1 U	1	0.2 J	0.28 J	0.03 J	0.02 J
Calcium	536	5,520	539	3,470	1,590	1,900
Chromium	5.9 K	18.5 K	6.9 K	15.1 K	15.1 K	18.7 K
Cobalt	1.7	4.3	1	3.4	2.7	2.8
Copper	3.8 K	512 K	5.9 K	37.9 K	46.9 K	48.1 K
Cyanide	0.28 J	0.77 U	0.77 U	0.77 U	0.84 U	0.84 U
Iron	4,770	13,700	4,450	11,000	11,000	11,800
Lead	6 K	39 K	18.4 K	19.2 K	12.7 K	11.3 K
Magnesium	328 K	3,550 K	341 K	2,130 K	1,440 K	1,330 K
Manganese	91.8 K	295 K	47.5 K	159 K	119 K	102 K
Mercury	0.033 U	0.02 J	0.01 J	0.02 J	0.01 J	0.01 J
Nickel	2.3 J	44.8 J	2.6 J	9 J	6 J	6.7 J
Potassium	249 K	1,540 K	232 K	2,040 K	1,280 K	1,000 K
Selenium	0.25 J	0.25 J	0.09 J	0.29 J	0.18 J	0.3 J
Silver	1.5 U	0.13 J	1.2 U	1.3 U	0.06 J	0.07 J
Sodium	20.9 K	83.8 K	17.1 K	49 K	37.1 K	39.6 K
Thallium	0.07 B	0.12 B	0.06 B	0.17 B	0.17 B	0.16 B
Vanadium	8.1	22	9.1	23.8	20.6	24
Zinc	8 K	91.7 K	13.9 K	119 K	61.1 K	55.1 K
Wet Chemistry						
pH	7	8.6	6.1	8.3	7.3	7.2
Total organic carbon (TOC) (UG/G)	2,100	2,600	3,900	5,200	5,500	5,300
Grain Size (PCT/P)						
GS07 Sieve 1" (25.0 mm)	100	100	100	100	100	100
GS08 Sieve 0.75" (19.0 mm)	100	100	100	96	100	95
GS09 Sieve 0.5" (12.5 mm)	100	80	98	88	96	89
GS10 Sieve 0.375" (9.5 mm)	100	64	98	87	96	88
Sieve No. 004 (4.75 mm)	100	54	98	83	93	86
Sieve No. 010 (2.00 mm)	100	43	97	80	90	84
Sieve No. 020 (850 um)	99	36	95	77	88	82
Sieve No. 040 (425 um)	95	31	89	71	82	77
Sieve No. 060 (250 um)	71	25	53	53	61	57
Sieve No. 100 (150 um)	45	18	16	36	40	37
Sieve No. 200 (75 um)	33	13	0.3	26	29	28

Notes:

Shading indicates detections
NA - Not analyzed
B - Analyte not detected above the level reported in associated blanks
J - Analyte present, value may or may not be accurate or precise
K - Analyte present, value may be biased high, actual value may be lower
L - Analyte present, value may be biased low, actual value may be higher
R - Unreliable Result
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
UL - Analyte not detected, quantitation limit is probably higher
MG/KG - Milligrams per kilogram
PCT/P - Percent Passed
PG/G - Picograms per gram
PH - pH units
UG/G - Micrograms per gram
UG/KG - Micrograms per kilogram

RESULTS OF ANALYSES O[illegible]ES COLLECTED IN THE VICINITY OF CHEATHAM ANNEX SITE 1, WINTER 1986.

SAMPLE STATIONS

Analytical Parameters	1EW01	1EW02	1EW03	1EW04	1GW05	1GW06
METALS						
Hexavalent chromium UG/L	<10	<10	<10	<10	<10	<10
pH	7.2	7.4	7.4	7.1	7.2	6.8
Sp Cond (umhos/cm @25 deg C)	840	370	825	500	380	817

CHEATHAM ANNEX SITE 9

SAMPLE STATIONS

PCB'S AND TCDD'S	9S01	9S02	9S03	9S04	9S05	9S06	9S07	9S08	9S09	9S10	9S11	9S12	9S13
	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Arochlor 1016	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arochlor 1221	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arochlor 1232	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arochlor 1242	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arochlor 1248	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arochlor 1254	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Arochlor 1260	<10	<10	<10	41	35	22	<10	<10	195	21	29	321	82
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50